

**UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

CHIP PACKAGING TECHNOLOGIES, LLC,

Plaintiff,

v.

INFINEON TECHNOLOGIES AG,

Defendant.

Civil Action No.

JURY TRIAL DEMANDED

**COMPLAINT FOR PATENT INFRINGEMENT AND DAMAGES
AND DEMAND FOR JURY TRIAL**

Plaintiff Chip Packaging Technologies, LLC (“Chip Packaging” or “Plaintiff”) files this Complaint for Patent Infringement and Damages against Infineon Technologies AG (“Infineon” or “Defendant”) and alleges as follows:

THE PARTIES

1. Chip Packaging is the current owner and assignee of the Asserted Patents.
2. Chip Packaging is a Texas limited liability company with its principal place of business located at 5830 Granite Parkway, Suite #100-216, Plano, TX 75024.
3. Upon information and belief, Infineon is a corporation formed under the laws of the Federal Republic of Germany, with a principal place of business at Am Campeon 1-15, 85579, Neubiberg, Germany.

JURISDICTION AND VENUE

4. This civil action arises under the patent laws of the United States, 35 U.S.C. § 1 *et seq.*, including without limitation 35 U.S.C. §§ 271, 281, 283, 284, and 285. Accordingly, this Court has subject matter jurisdiction under, *inter alia*, 28 U.S.C. §§ 1331 and 1338(a).

5. This Court has personal jurisdiction over Defendant. Defendant conducts business and has committed acts of patent infringement in this Judicial District, the State of Texas, and elsewhere in the United States.

6. Plaintiff's causes of action arise, at least in part, from Defendant's contacts with and activities in this District and the State of Texas.

7. Defendant has infringed the Asserted Patents within this District and the State of Texas by making, using, distributing, marketing, offering, and/or importing in or into this District and elsewhere in the State of Texas, products that infringe the Asserted Patents, including the Accused Products. Defendant, directly and through intermediaries, makes, uses, offers, imports, distributes, advertises, promotes, and/or otherwise commercializes such infringing products in or into this District and the State of Texas. Defendant regularly conducts and solicits business in, engages in other persistent courses of conduct in, and/or derives substantial revenue from goods and services provided to residents of this District and the State of Texas.

8. This Court has personal jurisdiction over Defendants pursuant to TEX. CIV. PRAC. & REM. CODE § 17.041 *et seq.*

9. Personal jurisdiction exists over Defendant because Defendant has minimum contacts with this forum as a result of business regularly conducted within this District and the State of Texas, and, on information and belief, specifically as a result of, at least, committing the tort of patent infringement within this District and the State of Texas.

10. This Court also has personal jurisdiction over Defendant, in part, because Defendant does continuous and systematic business in this District, including by providing infringing products to the residents of this District that Defendant knew would be used within this District, and by soliciting business from the residents of this District.

11. Venue is proper in this Judicial District pursuant to 28 U.S.C. § 1391 because, among other things, Defendant is not a resident in the United States, and thus may be sued in any judicial district pursuant to 28 U.S.C. § 1391(c)(3).

THE ASSERTED PATENTS

12. On February 16, 2016, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 9,263,299 (the “’299 Patent”) entitled “Exposed Die Clip Bond Power Package.” A true and correct copy of the ’299 Patent is attached hereto as Exhibit A.

13. CPT is the owner and assignee of all right, title, and interest in and to the ’299 Patent, including the right to assert all causes of action arising under the ’299 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

14. On March 29, 2016, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 9,299,646 (the “’646 Patent”) entitled “Lead Frame With Power And Ground Bars.” A true and correct copy of the ’646 Patent is attached hereto as Exhibit B.

15. Chip Packaging is the owner and assignee of all right, title, and interest in and to the ’646 Patent, including the right to assert all causes of action arising under the ’646 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

16. On September 4, 2012, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,258,611 (the “’611 Patent”) entitled “Leadframe Structure For Electronic Packages.” A true and correct copy of the ’611 Patent is attached hereto as Exhibit C.

17. Chip Packaging is the owner and assignee of all right, title, and interest in and to the '611 Patent, including the right to assert all causes of action arising under the '611 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

18. On June 20, 2017, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 9,685,351 (the "'351 Patent") entitled "Wire Bond Mold Lock Method And Structure." A true and correct copy of the '351 Patent is attached hereto as Exhibit D.

19. Chip Packaging is the owner and assignee of all right, title, and interest in and to the '351 Patent, including the right to assert all causes of action arising under the '351 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

20. On March 12, 2013, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,394,713 (the "'713 Patent") entitled "Method Of Improving Adhesion Of Bond Pad Over Pad Metallization With A Neighboring Passivation Layer By Depositing A Palladium Layer." A true and correct copy of the '713 Patent is attached hereto as Exhibit E.

21. Chip Packaging is the owner and assignee of all right, title, and interest in and to the '713 Patent, including the right to assert all causes of action arising under the '713 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

22. Chip Packaging has at all times complied with the marking provisions of 35 U.S.C. § 287 with respect to the Asserted Patents.

FACTUAL ALLEGATIONS

23. The Asserted Patents relate to groundbreaking improvements to semiconductor packaging technologies.

24. The technology in U.S. Patent No. 9,263,299 ("the '299 Patent") was developed by Leonardus Antonius Elisabeth van Gemert and Emil Casey Israel of NXP B.V.

25. The technology in U.S. Patent No. 9,299,646 (“the ’646 Patent”) was developed by Shailesh Kumar and Piyush Kumar Mishra of Freescale Semiconductor, Inc.

26. The technology in U.S. Patent No. 8,258,611 (“the ’611 Patent”) was developed by Ronald Schravendeel and Peter Schelwald of NXP B.V.

27. The technology in U.S. Patent No. 9,685,351 (“the ’351 Patent”) was developed by Leo M. Higgins, III of NXP USA, Inc.

28. The technology in U.S. Patent No. 8,394,713 (“the ’713 Patent”) was developed by Varughese Mathew of Freescale Semiconductor, Inc.

29. On information and belief, each of the Infineon products identified herein, including the Infineon OPTIREG Buck Regulator product line, the Infineon PROFET Smart High-Side Power Switch product line, the Infineon CoolGaN Integrated Power Stage products, the Infineon TC1782 AUDIO MAX Microcontroller, Infineon TLF51801 OPTIREG Asynchronous DC/DC Step-Down Converter, and the Infineon TLE9872 Motix 32-bit Microcontroller have been available for purchase in the United States, including but not limited to, directly from Infineon, through Infineon’s website, and/or through Infineon-authorized Americas distributors. By way of example only, the Infineon Buck Regulator products are available for purchase in the United States, including but not limited to through Infineon’s website through Infineon-authorized Global or Americas distributors:

[Home](#) > [Products](#) > [Power](#) > [DC-DC Converters](#) > [Integrated POL Voltage Regulators](#) > TDA38725A-0000

TDA38725A-0000

OptiMOS™ IPOL single-output synchronous buck regulator 25 A with PMBus interface

- Overview
- Parametrics
- Documents
- Order
- Design Support
- Partners
- Support

OptiMOS™ IPOL TDA38725A is an easy-to-use, fully integrated, highly efficient 25 A synchronous buck regulator with PMBUS Compliance. A proprietary fast COT engine enables a fast transient response and reduces the board footprint. TDA38725A offers best-in-class efficiency by using OptiMOS™ FETs, optimized for low-voltage high-current applications. Extensive protection features provide system-level security under fault conditions.

Summary of Features

- Wide input voltage range 3.0 - 17 V
- Output voltage range: 0.25 - 3.04 V
- Enhanced stability engine stable
- Opt. forced continuous conduction mode
- Switching frequency from 400 kHz - 2 MHz
- Monotonic start-up and soft-start time
- Thermally compensated internal OCP
- PMBus system interface for reporting
- Multiple time programming (MTP)
- Digitally programmable load-line
- Thermal shut down
- Operating temp: -40°C < Tj < 125°C

Potential Applications

- [DC-DC power conversion for telecom infrastructure](#)
- Base stations
- FPGA power
- Storage

Benefits

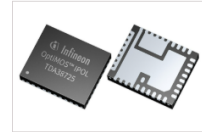
- Superior transient response
- Accurate output voltage regulation
- High efficiency and high power density
- Fast constant on-time PWM engine

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We offer the following online ordering options

TDA38725A0000AUMA1

Products > Power > DC-DC Converters > Integrated POL Voltage Regulators > TDA38725A-0000







	Stock*	Price per unit	Quantity
 Infineon	1137	\$ 4.95	<input type="text" value="1"/>
Standard Global Shipping		\$ 4.99	
			Add to cart

AMERICAS (in stock)

EMEA (in stock)

ASIA (in stock)

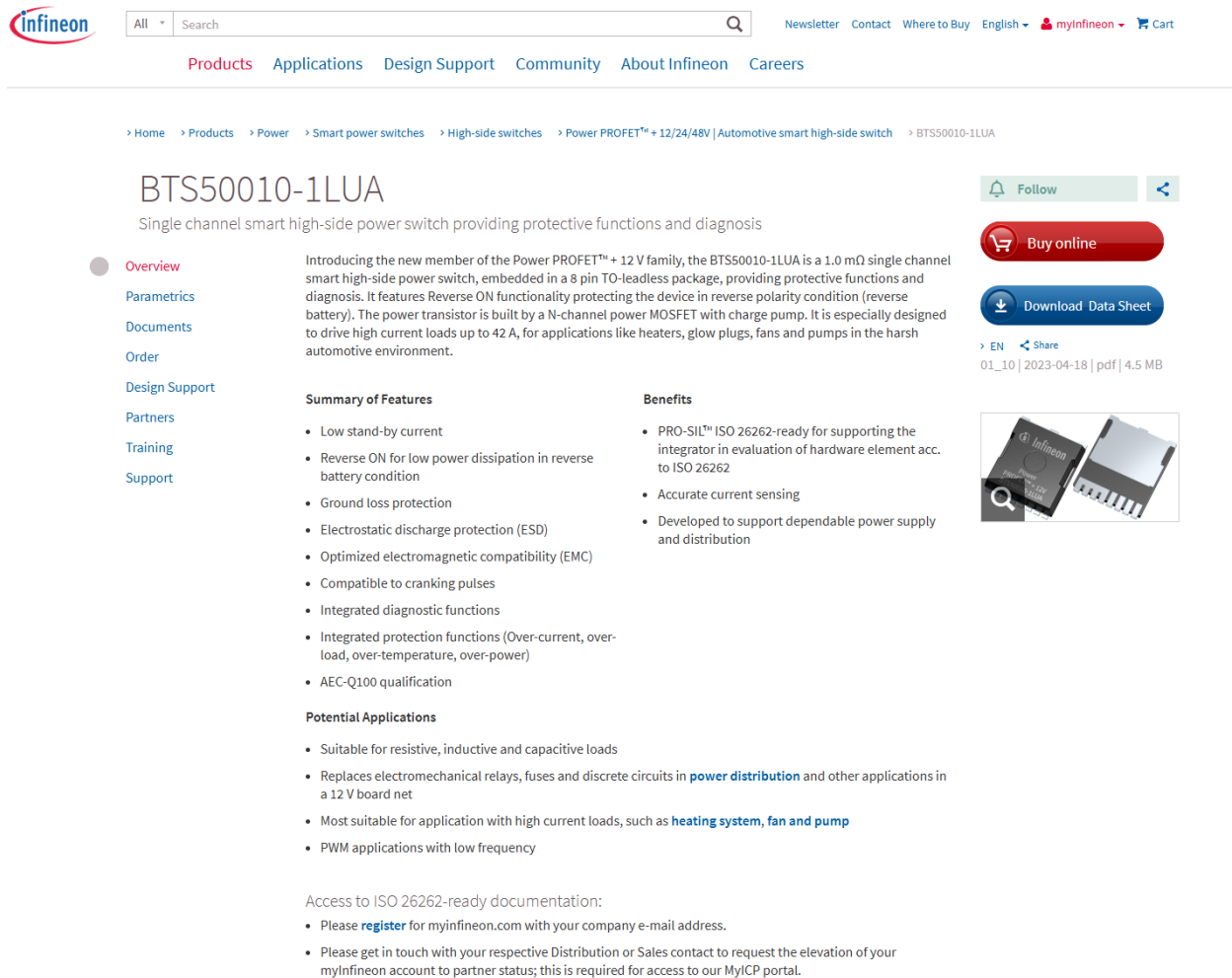
JAPAN (in stock)

Distributor	Stock*	
 DigiKey	5000	Order now
 MOUSER ELECTRONICS	2274	Order now
 ARROW	100	Order now
 AVNET	0	Order now
 FUTURE ELECTRONICS	0	Order now
 Newark	0	Order now

*stock values are subject to change

See https://www.digikey.com/en/products/detail/infineon-technologies/TDA38725A0000AUMA1/25595596?curr=usd&utm_campaign=buynow&utm_medium=aggregator&utm_source=octopart (last visited 1/27/2025).

30. As another example, the Infineon Smart High-Side Power Switch product line are available for purchase in the United States, including but not limited to through Infineon's website through Infineon-authorized Global or Americas distributors:



The screenshot shows the Infineon website's product page for the BTS50010-1LUA. The page layout includes a top navigation bar with the Infineon logo, a search bar, and links for Newsletter, Contact, Where to Buy, English, myInfineon, and Cart. Below this is a secondary navigation bar with links for Products, Applications, Design Support, Community, About Infineon, and Careers. The breadcrumb trail indicates the path: Home > Products > Power > Smart power switches > High-side switches > Power PROFET™ + 12/24/48V | Automotive smart high-side switch > BTS50010-1LUA.

BTS50010-1LUA

Single channel smart high-side power switch providing protective functions and diagnosis

Overview

Parametrics

Documents

Order

Design Support

Partners

Training

Support

Introducing the new member of the Power PROFET™ + 12 V family, the BTS50010-1LUA is a 1.0 mΩ single channel smart high-side power switch, embedded in a 8 pin TO-leadless package, providing protective functions and diagnosis. It features Reverse ON functionality protecting the device in reverse polarity condition (reverse battery). The power transistor is built by a N-channel power MOSFET with charge pump. It is especially designed to drive high current loads up to 42 A, for applications like heaters, glow plugs, fans and pumps in the harsh automotive environment.

Summary of Features

- Low stand-by current
- Reverse ON for low power dissipation in reverse battery condition
- Ground loss protection
- Electrostatic discharge protection (ESD)
- Optimized electromagnetic compatibility (EMC)
- Compatible to cranking pulses
- Integrated diagnostic functions
- Integrated protection functions (Over-current, over-load, over-temperature, over-power)
- AEC-Q100 qualification

Potential Applications

- Suitable for resistive, inductive and capacitive loads
- Replaces electromechanical relays, fuses and discrete circuits in **power distribution** and other applications in a 12 V board net
- Most suitable for application with high current loads, such as **heating system, fan and pump**
- PWM applications with low frequency

Benefits

- PRO-SiL™ ISO 26262-ready for supporting the integrator in evaluation of hardware element acc. to ISO 26262
- Accurate current sensing
- Developed to support dependable power supply and distribution


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Access to ISO 26262-ready documentation:


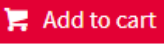
- Please **register** for myinfineon.com with your company e-mail address.
- Please get in touch with your respective Distribution or Sales contact to request the elevation of your myInfineon account to partner status; this is required for access to our MyICP portal.



We offer the following online ordering options

BTS500101LUAAUMA1

Products > Power > Smart power switches > High-side switches > Power PROFET™ + 12/24/48V |
Automotive smart high-side switch > BTS50010-1LUA

	Stock*	Price per unit	Quantity
 Infineon	1044	\$ 4.96	<input type="text" value="1"/>
Standard Global Shipping		\$ 4.99	
			

AMERICAS (in stock)

EMEA (in stock)

ASIA (in stock)

JAPAN (in stock)

Distributor	Stock*	
	3739	> Order now
	2088	> Order now
	0	> Order now
	0	> Order now
	0	> Order now
	0	> Order now
	0	> Order now

*stock values are subject to change

**Authorized resellers for overstock, and discontinued products which are warranted for reliability by the reseller,
no longer by Infineon

See <https://www.infineon.com/cms/en/product/power/smart-power-switches/high-side-switches/power-profet-plus-12v-automotive-smart-high-side-switch/bts500101lua/> (last visited 1/27/2025).

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All Products > Semiconductors > Power Management ICs > Power Switch ICs - Power Distribution > Infineon Technologies BTS500101LUAUMA1

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BTS500101LUAUMA1



Images are for reference only
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Mouser #: 726-BTS500101LUAUMA

Mfr. #: BTS500101LUAUMA1

Mfr.: Infineon Technologies

Customer #:

Description: Power Switch ICs - Power Distribution MULTICHIP PROFET & GD

Datasheet: [BTS500101LUAUMA1 Datasheet \(PDF\)](#)

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More Information [Learn more about Infineon Technologies BTS500101LUAUMA1](#)

[Add To Project](#) | [Add Notes](#)

In Stock: 2,088

Stock: 2,088 Can Ship Immediately

On Order: 2,000 Expected 3/12/2025

Factory Lead-Time: 39 Weeks

Minimum: 1 Multiples: 1

Enter Quantity:

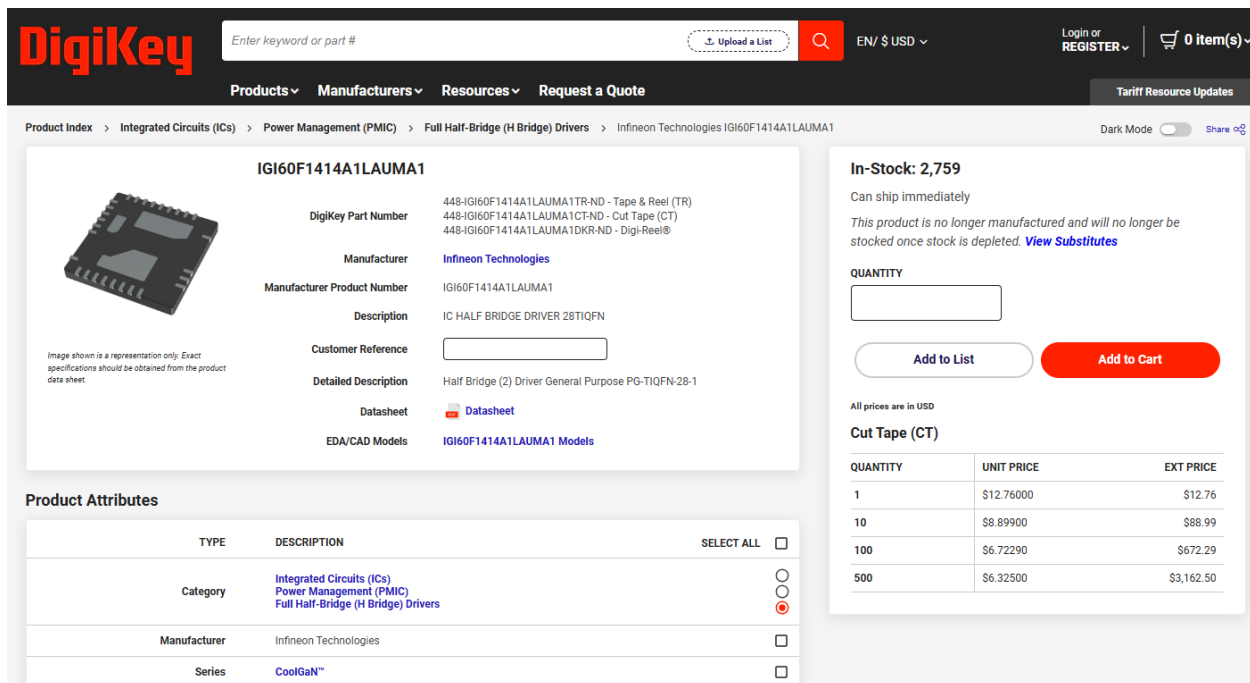
Pricing (USD)

Qty.	Unit Price	Ext. Price
Cut Tape / MouseReel™ †		
1	\$4.96	\$4.96
10	\$3.49	\$34.90
1,000	\$3.40	\$3,400.00
Full Reel (Order in multiples of 2000)		
2,000	\$2.76	\$5,520.00

† \$7.00 MouseReel™ fee will be added and calculated in your shopping cart. All MouseReel™ orders are non-cancellable and non-returnable.

See https://www.mouser.com/ProductDetail/Infineon-Technologies/BTS500101LUAUMA1?qs=8Wlm6%252BaMh8RV1CWLPmP8Ug%3D%3D&utm_source=octopart&utm_medium=aggregator&utm_campaign=726-BTS500101LUAUMA&utm_content=Infineon (last visited 1/27/2025).

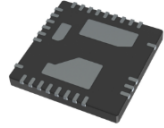
31. As another example, the Infineon CoolGaN Integrated Power Stage are available for purchase in the United States, including but not limited to through Infineon-authorized Global or Americas distributors:



DigiKey Enter keyword or part # EN/ \$ USD

Products ▾ Manufacturers ▾ Resources ▾ Request a Quote

Product Index > Integrated Circuits (ICs) > Power Management (PMIC) > Full Half-Bridge (H Bridge) Drivers > Infineon Technologies IGI60F1414A1LAUMA1



IGI60F1414A1LAUMA1

DigiKey Part Number 448-IGI60F1414A1LAUMA1TR-ND - Tape & Reel (TR)
448-IGI60F1414A1LAUMA1CT-ND - Cut Tape (CT)
448-IGI60F1414A1LAUMA1DKR-ND - Digi-Reel®

Manufacturer [Infineon Technologies](#)

Manufacturer Product Number IGI60F1414A1LAUMA1

Description IC HALF BRIDGE DRIVER 28TIQFN

Customer Reference

Detailed Description Half Bridge (2) Driver General Purpose PG-TIQFN-28-1

Datasheet [Datasheet](#)

EDA/CAD Models [IGI60F1414A1LAUMA1 Models](#)

Image shown is a representation only. Exact specifications should be obtained from the product data sheet.

In-Stock: 2,759
Can ship immediately
This product is no longer manufactured and will no longer be stocked once stock is depleted. [View Substitutes](#)

QUANTITY

All prices are in USD

Cut Tape (CT)

QUANTITY	UNIT PRICE	EXT PRICE
1	\$12.76000	\$12.76
10	\$8.89900	\$88.99
100	\$6.72290	\$672.29
500	\$6.32500	\$3,162.50

Product Attributes

TYPE	DESCRIPTION	SELECT ALL
Category	Integrated Circuits (ICs) Power Management (PMIC) Full Half-Bridge (H Bridge) Drivers	<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>
Manufacturer	Infineon Technologies	<input type="checkbox"/>
Series	CoolGaN™	<input type="checkbox"/>

See <https://www.digikey.com/en/products/detail/infineon-technologies/IGI60F1414A1LAUMA1/15776244> (last visited 1/27/2025).

32. As another example, the Infineon 32-bit MCU TriCore Package product line are available for purchase in the United States, including but not limited to through Infineon's website through Infineon-authorized Global or Americas distributors:



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SAK-TC1782F-320F180HR BA

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The TC1782 is the first member of the AUDIO MAX family designed for automotive applications.

Summary of Features

- Package: PG-LQFP-176
- CAN Nodes: 3
- Program Memory: 2.5 MB
- FlexRay™: yes
- Type of Serial I/O Interfaces: 2xASC, 3xSSC, 1xMSC, 1xMLI

Potential Applications

- Engine and transmission control
- 4-6 cylinder diesel or gasoline direct injection
- Double clutch transmission
- Hybrid and electric vehicle
- Suspension systems

Applications

> Diesel direct injection

TriCore™ - A Success Story



Did you know that TriCore™...


...was the first 32-bit automotive microcontroller with integrated DSP functionality?
...is used in every 2nd car produced today?
...is now in its fifth generation with its cutting-edge, 65nm AURIX™ family?



We offer the following online ordering options

TC1782F320F180HRBAKXUMA2

Products > Microcontroller > Legacy Microcontroller > Other Legacy MCUs > AUDO Family > TC1784/82 (AUDO MAX) > SAK-TC1782F-320F180HR BA

	Stock*	Price per unit	Quantity
 Infineon	987	\$ 23.98	<input type="text" value="1"/>
Standard Global Shipping		\$ 4.99	
			Add to cart

AMERICAS (in stock)

EMEA (in stock)

ASIA (in stock)

JAPAN (in stock)

Distributor	Stock*	
	2000	Order now
	1975	Order now
	1500	Order now
	729	Order now
	96	Order now
	0	Order now
	0	Order now

*stock values are subject to change

**Authorized resellers for overstock, and discontinued products which are warranted for reliability by the reseller, no longer by Infineon

See <https://www.infineon.com/cms/en/product/microcontroller/legacy-microcontroller/other-legacy-mcus/audco-family/tc1784-82-audio-max/sak-tc1782f-320f180hr-ba/> (last visited 1/27/2025).

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TC1782F320F180HRBAKXUMA2

MCU 32-Bit TC1782 TriCore RISC 2.5KB Flash 1.3V/3.3V 176-Pin LQFP EP T/R

Click image to enlarge

Infineon

Manufacturer: Infineon

Product Category: Microcontrollers, 32-bit Microcontrollers

Avnet Manufacturer Part #: TC1782F320F180HRBAKXUMA2

Compare

Datasheet

PCB Symbol, Footprint & 3D Model

RoHS 10 Compliant

Tape & Reel

Lifecycle

2000 - In Stock

Ships in 1 bus. day

Refresh Stock

Additional Inventory

Factory Lead Time - 33 Weeks

Price For: Each

USD\$:

\$15.65828

Quantity:

Min: 500 Mult: 500

500+

1,000+

2,000+

\$15.65828

\$15.53547

\$15.41266

More Pricing

Subtotal:

\$7,829.14

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Descriptions

Documents(1)

The TC1782 is the first member of the AUDIO MAX family designed for automotive applications.

Key Features

- Package: PG-LQFP-176
- CAN Nodes: 3
- Program Memory: 2.5 MB
- FlexRay™: yes
- Type of Serial I/O Interfaces: 2xASC, 3xSSC, 1xMSC, 1xMLI

Technical Attributes

Find similar parts by checking the relevant boxes below, then clicking the "FIND SIMILAR PARTS" button underneath the table.

Description	Value
ADC Channels	36
ADC Resolution	10-bit
Data Bus Width	32 Bit
Device Core	TriCore
IC Case / Package	LQFP EP

See https://www.avnet.com/shop/us/products/infineon/tc1782f320f180hrbaxuma2-3074457345624887968?CMP=EMA_Octopart_inventoryfeed_VSE (last visited 1/27/2025).

33. As another example, the Infineon TLF51801 Asynchronous DC/DC Step-Down Converter product line are available for purchase in the United States, including but not limited to through Infineon's website through Infineon-authorized Global or Americas distributors:



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Home Products Power DC-DC Converters Switching regulators OPTIREG™ Switchers (automotive) TLF51801ELV

TLF51801ELV

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The TLF51801ELV is a PWM step-down DC/DC controller with external power switches, packaged in a small, thermal enhanced PG-SSOP-14 with exposed pad.

The regulator is capable to drive external power-stages (n/n-MOS) for loads up to 10 A. The current limitation function is using either the $R_{ds(on)}$ of the HS-switch or a external shunt resistor. The output voltage with a 2% tolerance is adjustable. The device can run with a duty cycle larger than 99%. The bootstrap diode is integrated to save external components. The switching frequency can be set between 100 kHz and 700 kHz or can be synchronized to an external clock. During start-up the integrated soft-start limits the inrush current peak and prevents from an output voltage overshoot. The enable function, in shutdown mode with less than 2 μ A current consumption, enables easy power management in battery-powered systems. The TLF51801ELV includes protection features such as a cycle-by-cycle current limitation, over-temperature shutdown and input under voltage lockout. With a temperature range T_J from -40°C to 150°C the device is suitable for harsh environment of automotive applications

Summary of Features

- Controller for loads up to 10A
- Driving external power-stage (n/n-MOS)
- Current limitation using the $R_{ds(on)}$ of the HS-switch or via shunt-resistor
- Adjustable output voltage: 1.2V up to $D_{max} \cdot V_s$
- $\pm 2\%$ output voltage tolerance
- Duty cycle > 99%
- Integrated bootstrap diode
- Input voltage range from 4.75V to 45V
- Adjustable switching frequency: 100 kHz up to 700 kHz
- Synchronization input
- EN for ultra-low shut-down current (< 2 μ A)
- Integrated soft-start function
- Suited for automotive applications: $T_J = -40^\circ\text{C}$ to $+150^\circ\text{C}$
- Green Product (RoHS compliant)
- AEC Qualified

Benefits

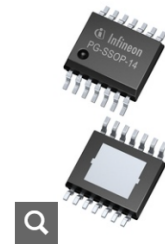
- $R_{ds(on)}$ -current limitation saves external shunt resistor and board space
- Integrated bootstrap diode saves external components and board space
- High duty cycle allows low drop-out operation
- Integrated soft-start function saves external components and board space

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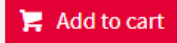




We offer the following online ordering options

TLF51801ELVXUMA1

Products > Power > DC-DC Converters > Switching regulators > OPTIREG™ Switchers (automotive) > TLF51801ELV









	Stock*	Price per unit	Quantity
 Infineon	1232	\$ 3.47	<input type="text" value="1"/>
Standard Global Shipping		\$ 4.99	
			

AMERICAS (in stock)

EMEA (in stock)

ASIA (in stock)

JAPAN (in stock)

Distributor	Stock*	
	9945	› Order now
	6011	› Order now
	5045	› Order now
	5000	› Order now
 **	2357	› Order now
	1740	› Order now
	0	› Order now
	0	› Order now

*stock values are subject to change

**Authorized resellers for overstock, and discontinued products which are warranted for reliability by the reseller, no longer by Infineon

See <https://www.infineon.com/cms/en/product/power/dc-dc-converters/switching-regulators/optireg-switchers-automotive/tlf51801elv/> (last visited 1/27/2025).

The screenshot displays the Infineon Technologies AG website for the TLF51801ELVXUMA1 product. The page is structured as follows:

- Header:** Includes navigation links for Businesses, About, Login, ENG, \$ USD, and MyArrow™. A search bar is present with the text "Search millions of products, datasheets, and more at Arrow Electronics".
- Breadcrumb:** Home / Categories / Power Management / Power Controllers / DC to DC Controller / TLF51801ELVXUMA1 - Infineon Technologies AG
- Product Information:**
 - Product Name:** TLF51801ELVXUMA1
 - Category:** DC to DC Controllers
 - Description:** DC/DC Cntrlr Single-OUT Step Down 700kHz Automotive AEC-Q100 14-Pin SSOP EP T/R
 - Actions:** DOWNLOAD DATASHEET, SYMBOLS AND FOOTPRINTS
 - Link:** See all DC to DC Controllers by Infineon Technologies AG
- Product Technical Specifications:**

EU RoHS	Compliant
ECCN (US)	EAR99
Part Status	Active
HTS	COMPONENTS
Automotive	Yes
PPAP	Unknown
Number of Outputs	1
Topology	Step Down
Output Voltage (V)	1.176 to 1.224
Maximum Switching Frequency (kHz)	700
Minimum Input Voltage (V)	4.75
Maximum Input Voltage (V)	45
Operating Supply Voltage (V)	4.75 to 45
Minimum Switching Frequency (kHz)	100
Minimum Operating Temperature (°C)	-40
Maximum Operating Temperature (°C)	150
Packaging	Tape and Reel
Mounting	Surface Mount
Package Height	1.45
Package Width	3.9
Package Length	4.9
PCB changed	14
- Purchasing Information:**
 - Total In Stock:** 11,034 parts
 - Regional Inventory:** 5,000
 - QUANTITY:** Increments of 2500, Minimum 2500
 - Enter Qty:** [Input field]
 - BUY:** [Button]
 - TOTAL:** \$3,375.00 (Price for 2500)
 - Add to BOM:** [Link]
 - 6,034 In stock: Ships tomorrow** [Dropdown]
 - 5,000 In stock: Ships in 2 days** [Dropdown]
 - IN STOCK:** [Checkmark]
 - Ships in 2 days:** [Icon]
 - In stock: 5,000 parts**
 - Price Table:**

Quantity	Price
2500+	\$1.3500
5000+	\$1.2879
 - Shipping Details:**
 - Ships from:** Netherlands
 - Date Code:** 2304+
 - Manufacturer:** 8 weeks
 - Lead Time:**
 - Country Of Origin:** Malaysia
- Footer:** Includes a Verical advertisement with the text "Still looking for the parts you need?" and "SHOP VERICAL.COM".

See https://www.arrow.com/en/products/tlf51801elvxuma1/infineon-technologies-ag?region=europe&utm_campaign=octopart_2022&utm_content=inv_listing&utm_currency=USD&utm_keyword=TLF51801ELVXUMA1&utm_medium=aggregator&utm_source=octopart (last visited 1/27/2025).

34. As another example, the Infineon TLE9872 Microcontroller product line are available for purchase in the United States, including but not limited to through Infineon's website through Infineon-authorized Global or Americas distributors:



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TLE9872QTW40

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MOTIX™ TLE9872QTW40 offers high reliability within automotive BLDC applications in TQFP package

The TLE9872QTW40 is part of the **MOTIX™ TLE987x** product family. The TLE9872QTW40 is a single chip 3-Phase motor driver that integrates the industry standard Arm® Cortex®-M3 core, enabling the implementation of advanced motor control algorithms such as field-oriented control. It includes six fully integrated NFET drivers optimized to drive a 3-Phase motor via six external power NFETs, a charge pump enabling low voltage operation and programmable current along with current slope control for optimized EMC behavior. Its peripheral set includes a current sensor, a successive approximation ADC synchronized with the capture and compare unit for PWM control and 16-bit timers. A LIN transceiver is also integrated to enable communication to the device along with a number of general purpose I/Os. It includes an on-chip linear voltage regulator to supply external loads.

It is a highly integrated **AEC-Q100 Grade 0** automotive qualified device enabling cost and space efficient solutions for BLDC motor drive applications.

Summary of Features:

- Six current programmable Drivers with charge pump for N-Channel MOSFET
- Integrated LIN transceiver compatible with LIN 2.2 and SAEJ2602
- Two Full duplex serial interface (UART) with LIN support
- Two Synchronous serial channel (SSC)
- On-chip OSC and PLL for clock generation
- One high voltage monitoring input with wake up functionality
- High speed operational amplifier for motor current sensing via shunt
- Measurement unit:
 - 8-bit ADC module with 10 multiplexed inputs
 - 10-bit ADC module with 8 multiplexed inputs, 5 external Analog inputs
 - On chip temperature and battery voltage measurement unit
- Increased Temperature Shutdown supports operation up to $T_{jmax} = 175^{\circ}C$
- Independent Programmable window watchdog
- 5V/1.5V Internal supplies

Features of the Microcontroller:

- 32 bit Arm® Cortex®-M3 Core, up to 40 MHz clock frequency
- 256 kByte flash memory for code and data
- 32 kByte Boot ROM memory in code space (used for boot code and IP storage)
- 8 kByte RAM memory
- Harvard architecture
- Thumb®-2 Instruction Set and hardware divide and multiplication unit
- Four 16-Bit timers
- Capture/compare unit for PWM signal generation (CCU6) with 2 x 16-bits timers

General Characteristics:


- Operating supply voltage $V_s = 5.5$ to 27V, maximum rating 40V
- Extended operating range $V_s = 3.0$ to 28V, MCU / Flash fully functional
- ESD performance :
 - up to 2kV / handling on all pins
 - 4kV @ HV inputs
 - 6kV @ LIN pin



We offer the following online ordering options

TLE9872QTW40XUMA1

Products > Microcontroller > MOTIX™ MCU | 32-bit motor control SoC (system-on-chip) > 3-Phase Bridge Driver IC with Integrated Arm® Cortex® M3 > TLE9872QTW40

	Stock*	Price per unit	Quantity
 Infineon	1207	\$ 7.09	<input type="text" value="1"/>
Standard Global Shipping		\$ 4.99	
			Add to cart

AMERICAS (in stock)

EMEA (in stock)

ASIA (in stock)

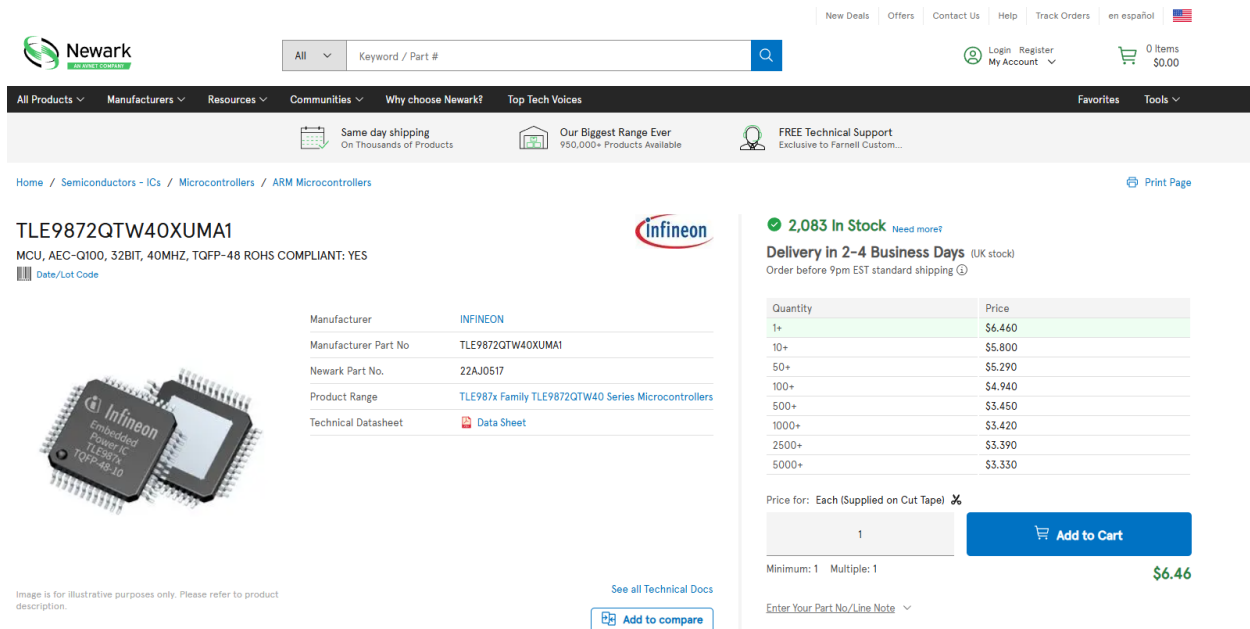
JAPAN (in stock)

Distributor	Stock*	
 DigiKey	2604	Order now
 MOUSER ELECTRONICS	2415	Order now
 Newark	2083	Order now
 Rochester Electronics **	2072	Order now
 ARROW	0	Order now
 FUTURE ELECTRONICS	0	Order now
 AVNET	0	Order now

*stock values are subject to change

**Authorized resellers for overstock, and discontinued products which are warranted for reliability by the reseller, no longer by Infineon

See <https://www.infineon.com/cms/en/product/microcontroller/embedded-power-ics-system-on-chip-3-phase-bridge-driver-integrated-arm-cortex-m3/tle9872qtw40/> (last visited 1/27/2025).



TLE9872QTW40XUMA1
MCU, AEC-Q100, 32BIT, 40MHZ, TQFP-48 ROHS COMPLIANT: YES
[Date/Lot Code](#)

Manufacturer: INFINEON
Manufacturer Part No: TLE9872QTW40XUMA1
Newark Part No: 22AJ0517
Product Range: TLE987x Family TLE9872QTW40 Series Microcontrollers
Technical Datasheet: [Data Sheet](#)

Quantity Price
1+ \$6.460
10+ \$5.800
50+ \$5.290
100+ \$4.940
500+ \$3.450
1000+ \$3.420
2500+ \$3.390
5000+ \$3.330

Price for: Each (Supplied on Cut Tape) ✖
1 [Add to Cart](#)
Minimum: 1 Multiple: 1 **\$6.46**

Enter Your Part No./Line Note

Technical Specifications

Product Range	TLE987x Family TLE9872QTW40 Series Microcontrollers	Device Core	ARM Cortex-M3
Data Bus Width	32bit	Data Bus Width	32 bit
Operating Frequency Max	40MHz	Program Memory Size	256KB
RAM Memory Size	8KB	No. of Pins	48Pins
CPU Speed	40MHz	No. of I/O's	10/I/O's
		MCU Case Style	TQFP

See <https://www.newark.com/infineon/tle9872qtw40xuma1/mcu-aec-q100-32bit-40mhz-tqfp/dp/22AJ0517?CMP=AFC-OP> (last visited 1/27/2025).

FIRST COUNT
(Infringement of U.S. Patent No. 9,263,299)

35. Chip Packaging incorporates by reference the allegations set forth in Paragraphs 1-34 of the Complaint as though fully set forth herein.

36. The claims of the '299 Patent are valid and enforceable.

37. Infineon has and continues to directly infringe the '299 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States the Accused Products made using the patented methods including, but not limited to, products that satisfy each and every limitation of one or more claims of the '299 Patent. Upon information and belief, such products include at least the Infineon OPTIREG Buck Regulator product line, including but not limited to: TDA38725. On information and belief, this further includes the Infineon Smart High-Side Power Switch product line including but not limited to the BTS50005-1LUA.

38. For example, the Accused Products incorporates and/or implements elements that are identical or equivalent to each claimed element of the patented invention pointed out by at least Claim 1 of the '299 Patent.

39. Claim 1 of the '299 Patent recites:

1. A method for packaging an integrated circuit (IC) device, the method comprising:

mounting a plurality of active device die, into predetermined positions, onto a temporary carrier, each said active device die having bond pads, each of said active device die having a solderable conductive surface on its underside; and having been subjected to back-grinding to a prescribed thickness;

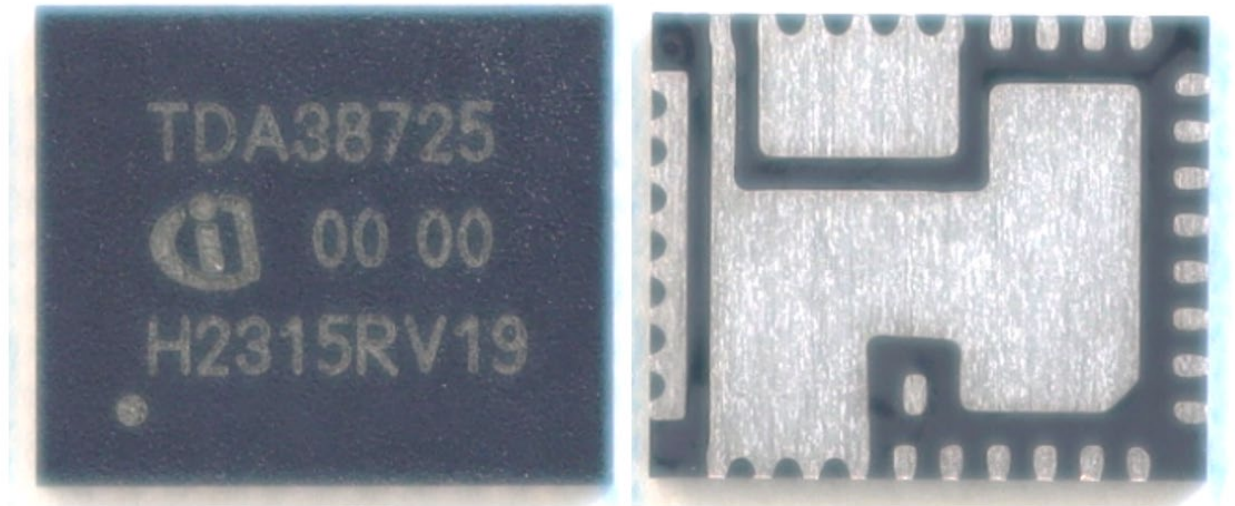
dispensing a solder paste onto the bond pads on the plurality active device die;

attaching a lead frame to the temporary carrier, the lead frame having an array of device positions which correspond to the predetermined positions of the plurality of active device die, wherein upper lead frame portions contact the solder paste present on the bond pads and lower lead frame portions contact the temporary carrier; and

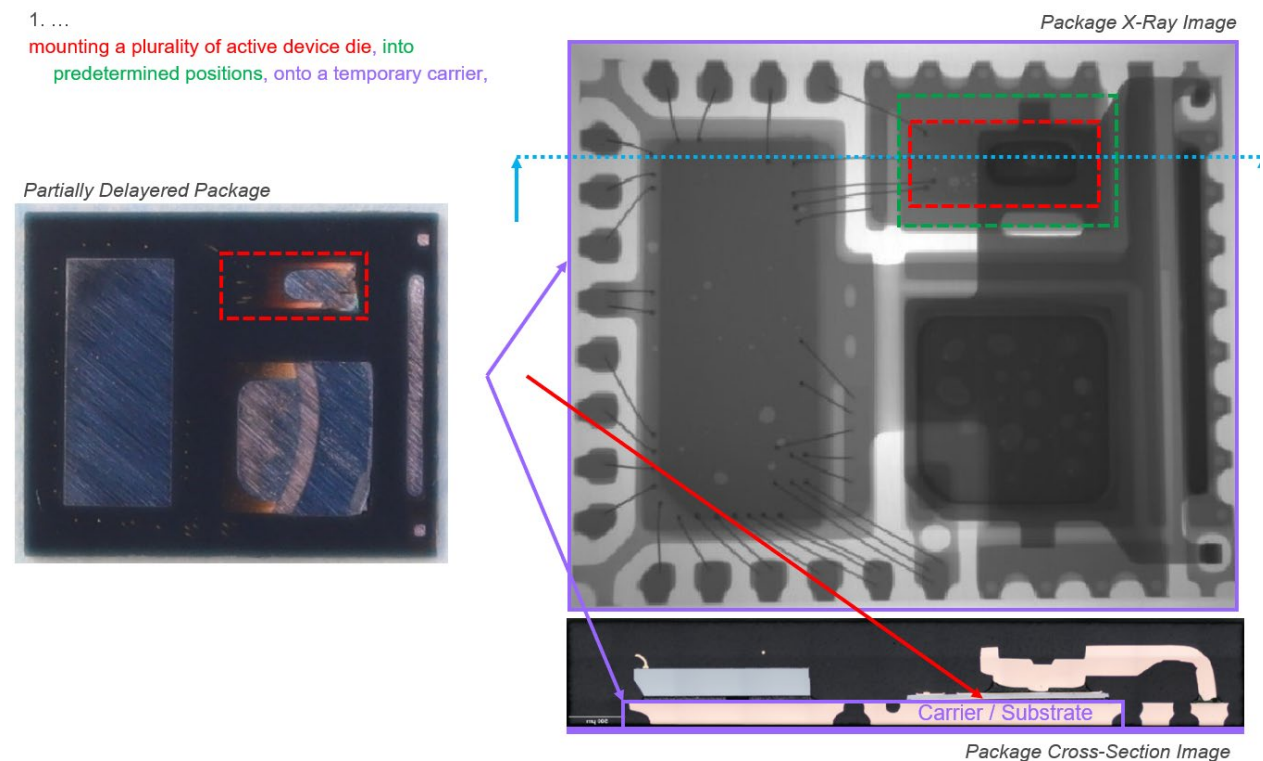
reflowing the solder so that a connection is made between the upper lead frame portions and the bond pads of the plurality of active device die.

'299 Patent, Cl. 1.

40. For example, the Infineon Buck Regulator implements a method for packaging an integrated circuit (IC) device. The integrated circuit (IC) device of the Infineon Buck Regulator is illustrated below:

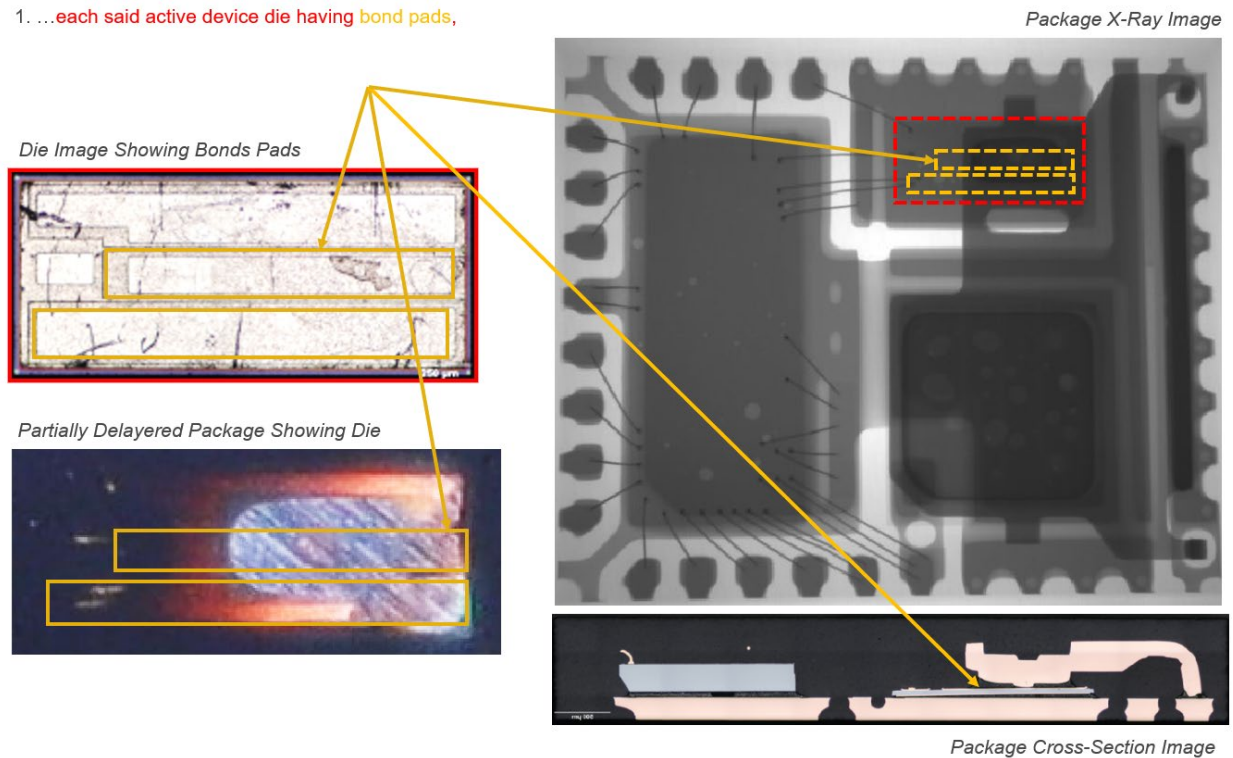


41. On information and belief, the Accused Products are manufactured using a process that mounts a plurality of active device die, into predetermined positions, onto a temporary carrier.



42. On information and belief, within the Accused Products each active die has bond pads.

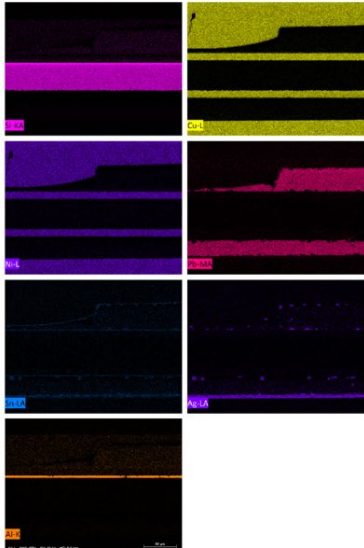
1. ...each said active device die having bond pads,



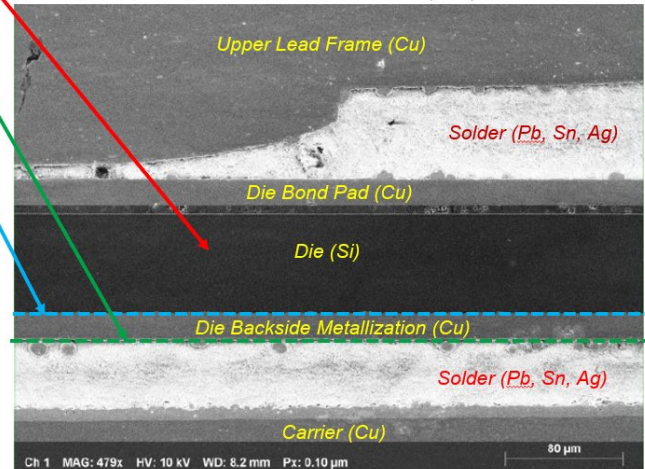
43. On information and belief, within the Accused Products each active die has a solderable conductive surface on its underside; and has been subjected to back-grinding to a prescribed thickness.

1. ...each of said active device die having a solderable conductive surface on its underside; and having been subjected to back-grinding to a prescribed thickness;

Energy Dispersive X-ray Spectra Dot Maps



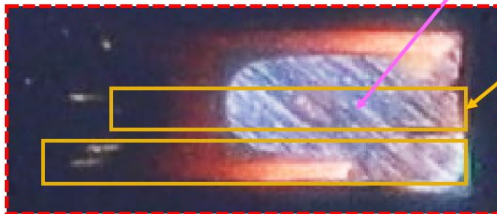
Cross-Section of Carrier, Die, and Lead Frame



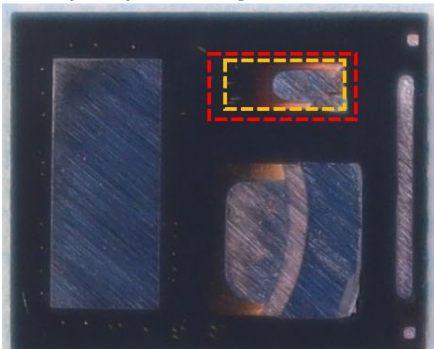
44. On information and belief, the Accused Products are manufactured using a process that dispenses a solder paste onto the bond pads on the plurality active device die.

1. ...
dispensing a solder paste onto the bond pads on the plurality active device die;

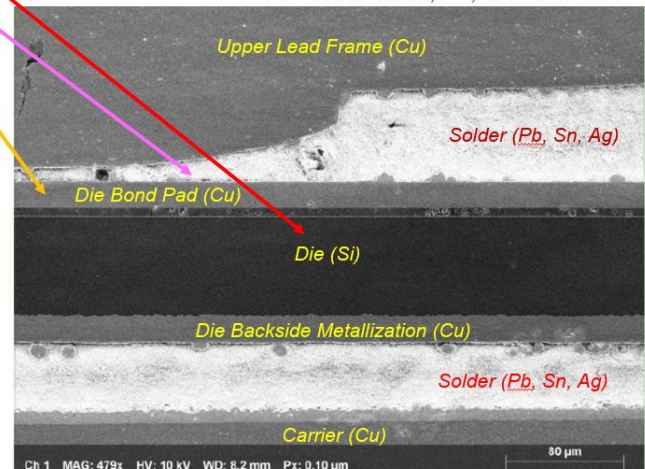
Partially Delayered Package Showing Die



Partially Delayered Package



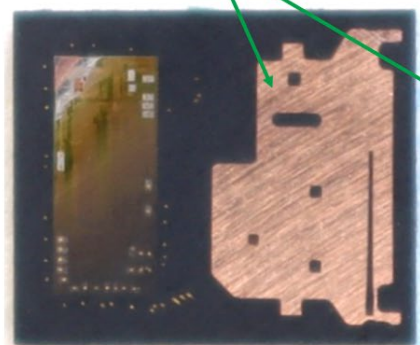
Cross-Section of Carrier, Die, and Lead Frame



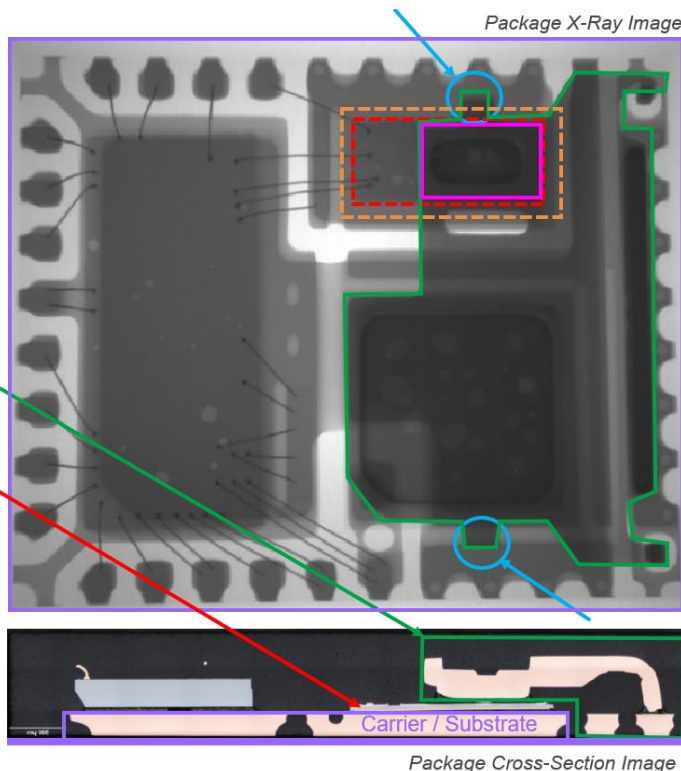
45. On information and belief, the Accused Products are manufactured using a process that attaches a lead frame to the temporary carrier, the lead frame having an array of device positions which correspond to the predetermined positions of the plurality of active device die.

1. ...

attaching a lead frame to the temporary carrier, the lead frame having an array of device positions which correspond to the predetermined positions of the plurality of active device die,



Partially Delayered Package



Package X-Ray Image

Carrier / Substrate

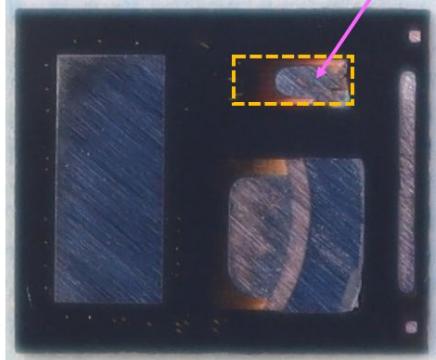
Package Cross-Section Image

46. On information and belief, the Accused Products are manufactured using a process wherein the upper lead frame portions contact the solder paste present on the bond pads.

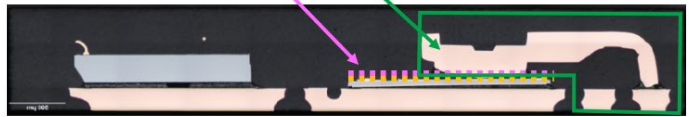
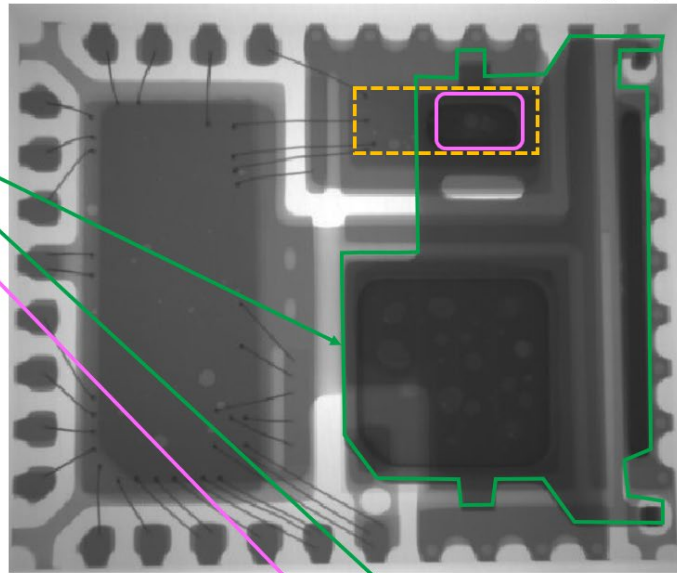
1. ...

wherein upper lead frame portions contact the solder paste present on the bond pads and

Partially Delayed Package



Package X-Ray Image



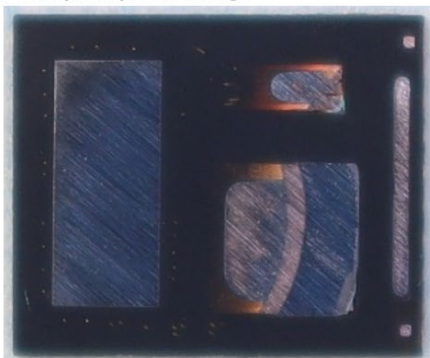
Package Cross-Section Image

47. On information and belief, the Accused Products are manufactured using a process wherein the lower lead frame portions contact the temporary carrier.

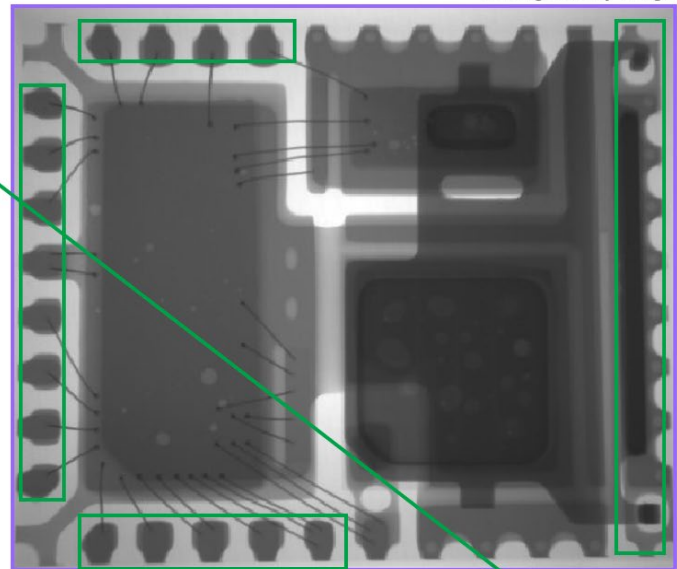
1. ...

lower lead frame portions contact the temporary carrier; and

Partially Delayed Package



Package X-Ray Image

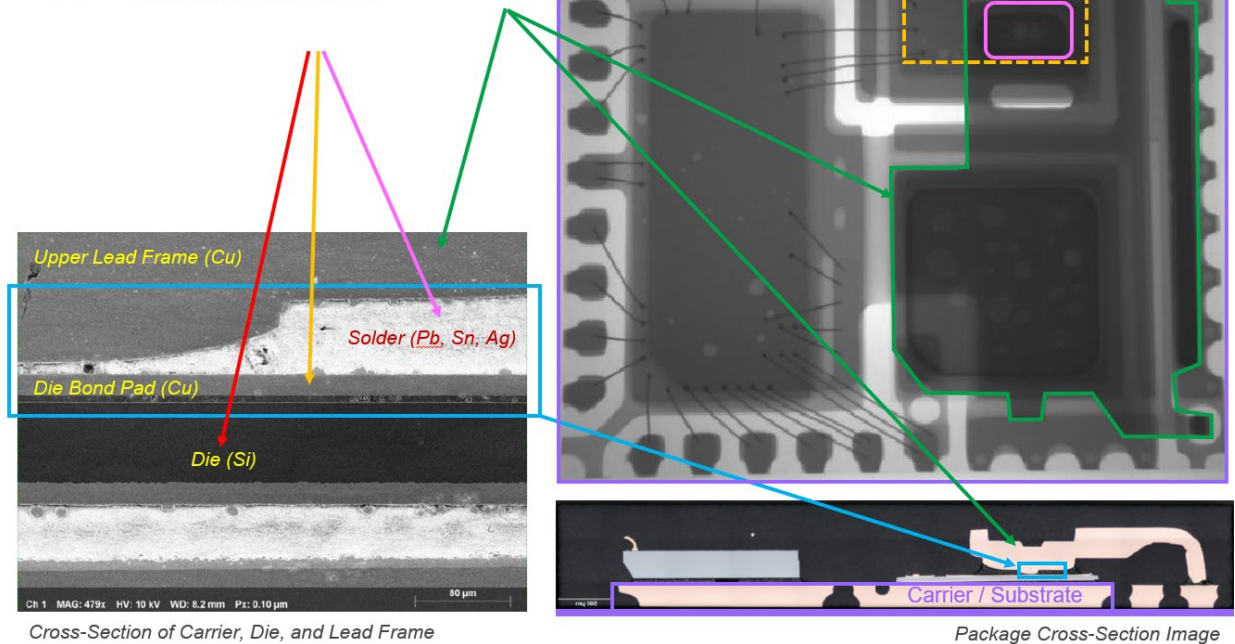


Package Cross-Section Image

48. On information and belief, the Accused Products are manufactured using a process that reflows the solder so that a connection is made between the upper lead frame portions and the bond pads of the plurality of active device die.

1. ...

reflowing the solder so that a connection is made between the upper lead frame portions and the bond pads of the plurality of active device die.



49. Fact and expert discovery are expected to confirm that the Accused Products infringe the '299 Patent, for which further evidence may lie in whole or in part in technical documents to which Chip Packaging does not presently have access.

50. Further, on information and belief, Defendant has and continues to indirectly infringe one or more claims of the '299 Patent, including claim 1, by knowingly and intentionally inducing others, including third-party semiconductor foundries, other types of third-party manufacturers, customers, and/or end-users to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States the Accused Products.

51. Defendant, with knowledge that these products, and/or the manufacture thereof, infringe the '299 Patent at least as of the date of this Complaint, knowingly and intentionally induced, and continues to knowingly and intentionally induce direct infringement of the '299 Patent by contracting for the third-party manufacture of, and/or providing the Accused Products to direct infringers.

52. Defendant has induced infringement by others, including third-party semiconductor foundries, other types of third-party manufacturers, customers, and/or end-users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there was a high probability that others infringe the '299 Patent, but while remaining willfully blind to the infringement.

53. Defendant has and continues to infringe one or more claims of the '299 Patent by importing into the United States or offering to sell, selling, or using within the United States a product which is made by a process patented in the United States.

54. Defendant is not licensed or otherwise authorized to practice the claims of the '299 Patent.

55. Thus, by its acts, Defendant has injured Chip Packaging and is liable to Chip Packaging for directly and/or indirectly infringing one or more claims of the '299 Patent, whether literally or under the doctrine of equivalents, including without limitation claim 1.

56. As a result of Defendant's infringement of the '299 Patent, Chip Packaging has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Defendant's infringement, but in no event less than a reasonable royalty with interest and costs.

SECOND COUNT
(Infringement of U.S Patent No. 9,299,646)

57. Chip Packaging incorporates by reference the allegations set forth in Paragraphs 1-56 of the Complaint as though fully set forth herein.

58. The claims of the '646 Patent are valid and enforceable.

59. Infineon has and continues to directly infringe the '646 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States the Accused Products made using the patented methods including, but not limited to, products that satisfy each and every limitation of one or more claims of the '646 Patent. Upon information and belief, such products include at least the Infineon 32-bit TriCore AUDIO MAX MCU Package TC1782N320F180HRBAKXUMA2 and all other products with power and ground bar arrangements that are not colorably different.

60. For example, the Accused Products incorporates and/or implements elements that are identical or equivalent to each claimed element of the patented invention pointed out by at least Claim 1 of the '646 Patent.

61. Claim 1 of the '646 Patent recites:

1. A semiconductor device, comprising:

a semiconductor die having a plurality of first contact pads and at least one second contact pad disposed on or exposed through a surface thereof;

a package casing that covers the semiconductor die;

a plurality of signal leads spaced apart from the semiconductor die and each having an embedded portion located within the package casing and an exposed portion located outside of the package casing, each of the signal leads being electrically connected to a respective one of the first contact pads;

a power bar extending at least partially in an area between the embedded portions of the plurality of signal leads and the semiconductor die and having a first side opposing the signal leads and a second side opposing

the semiconductor die, the power bar being electrically connected to the at least one second contact pad; and

a ground bar that is electrically grounded and extends at least partially in said area, the ground bar having a first portion disposed between the embedded portions of the plurality of signal leads and the first side of the power bar, and a second portion disposed between the second side of the power bar and the semiconductor die.

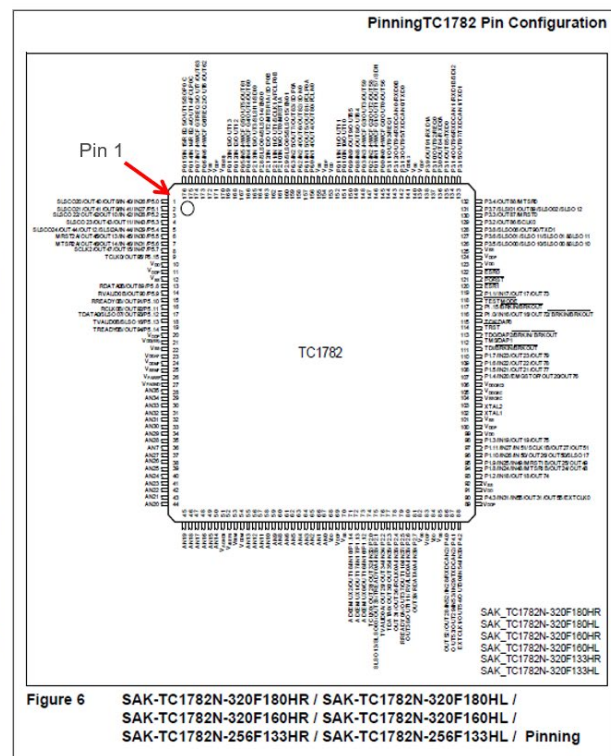
'646 Patent, Cl. 1.

62. For example, the Infineon 32-bit MCU TriCore Package is a semiconductor device:

1. A semiconductor device, comprising:

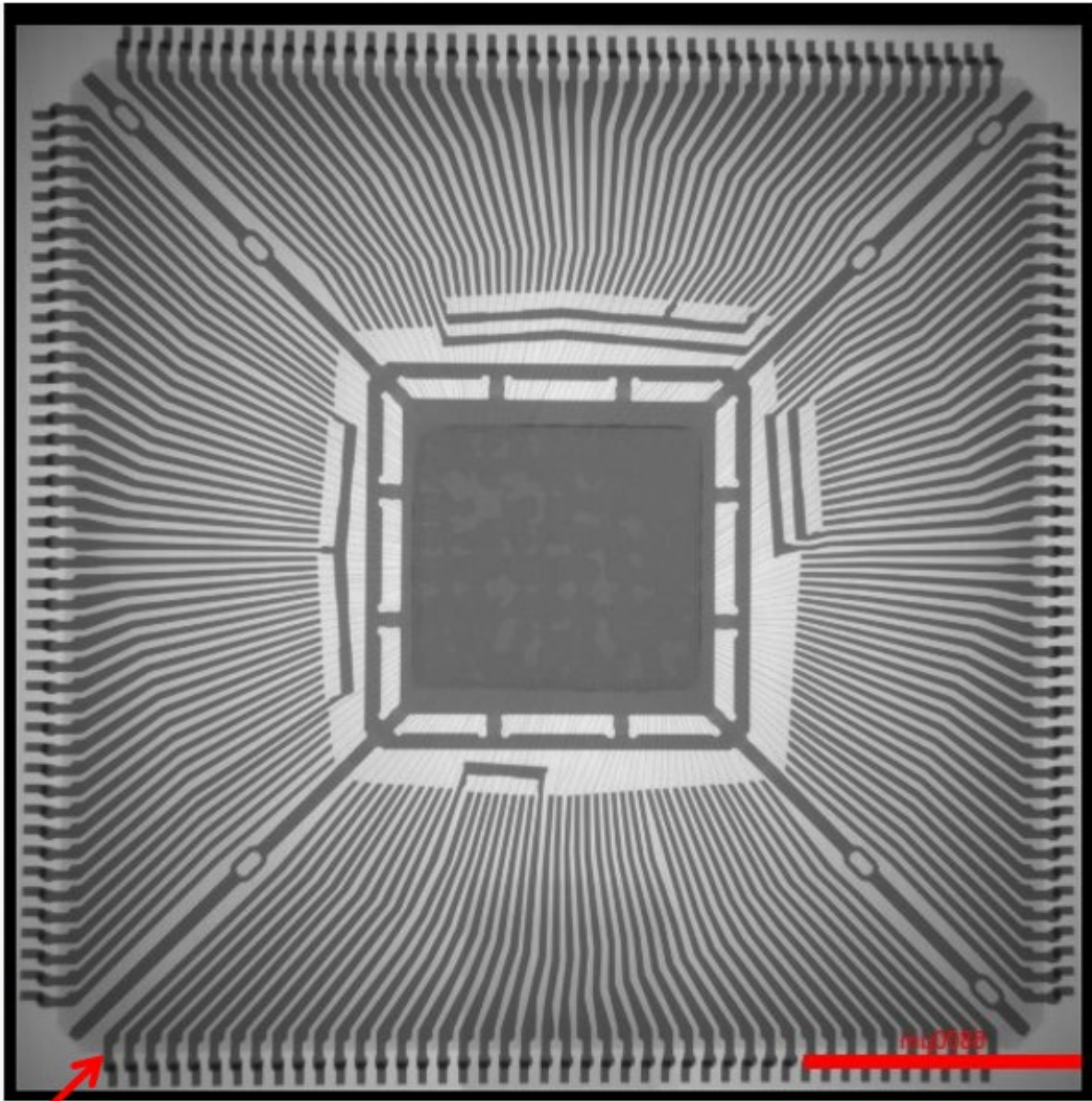


Pin 1 TC1782N320F180HRBAKXUMA2



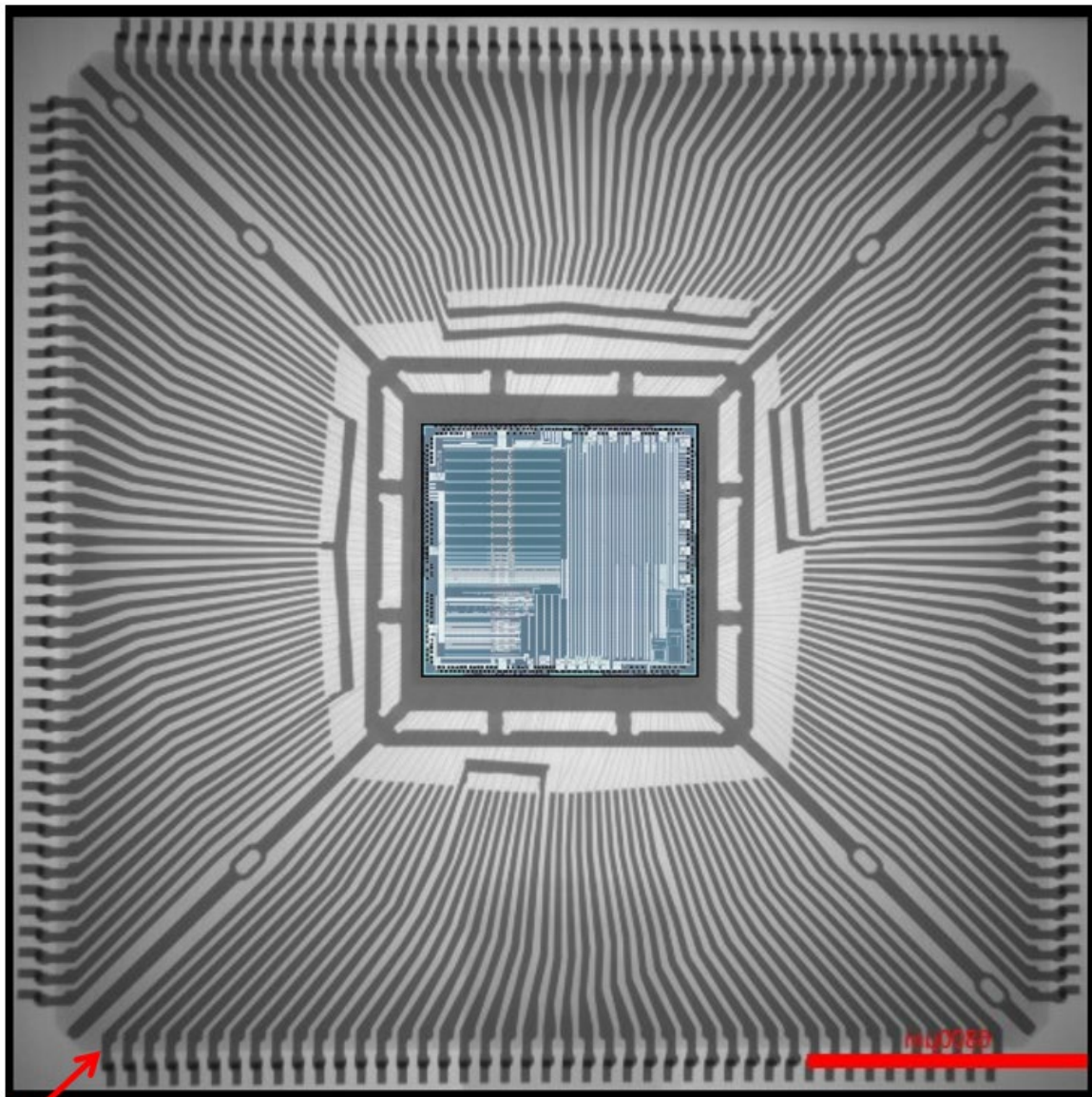
Source: Infineon [TriCore TC1782 32-Bit MCU Datasheet](#)

Infinion TriCore Package X-Ray Image



Pin 1

Infineon TriCore Die Image Overlayed Onto Lead Frame X-Ray Image



Pin 1

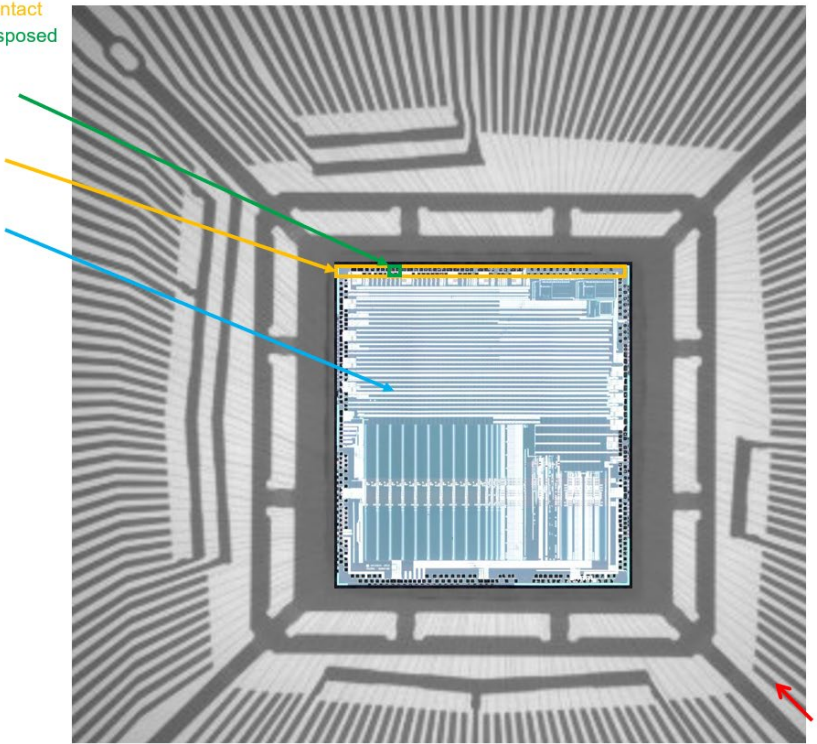
63. On information and belief, the Infineon 32-bit MCU TriCore Package includes a semiconductor die having a plurality of first contact pads and at least one second contact pad disposed on or exposed through a surface thereof.

1. ...

a semiconductor die having a plurality of first contact pads and at least one second contact pad disposed on or exposed through a surface thereof;



Infineon TriCore Die Image Over Lead Frame X-Ray (Rotated 90 deg CCW)

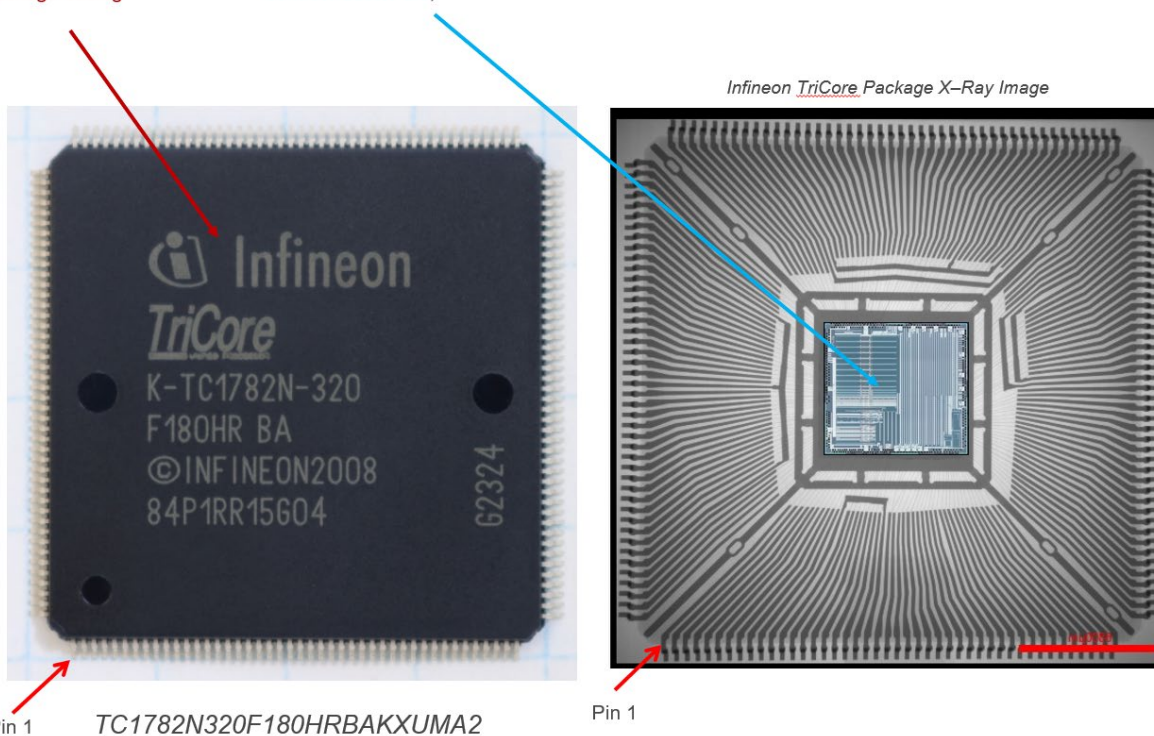


Pin 1

64. On information and belief, the Infineon 32-bit MCU TriCore Package includes a package casing that covers the semiconductor die.

1. ...

a package casing that covers the semiconductor die;



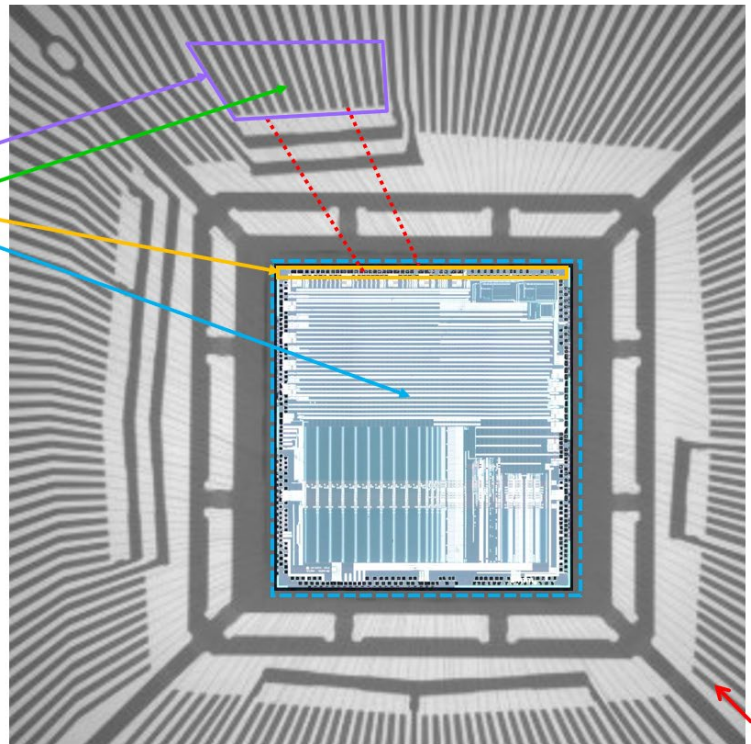
65. On information and belief, the Infineon 32-bit MCU TriCore Package includes a plurality of signal leads spaced apart from the semiconductor die and each having an embedded portion located within the package casing and an exposed portion located outside of the package casing, each of the signal leads being electrically connected to a respective one of the first contact pads.

1. ...

a plurality of signal leads spaced apart from the semiconductor die and each having an embedded portion located within the package casing and an exposed portion located outside of the package casing, each of the signal leads being electrically connected to a respective one of the first contact pads;

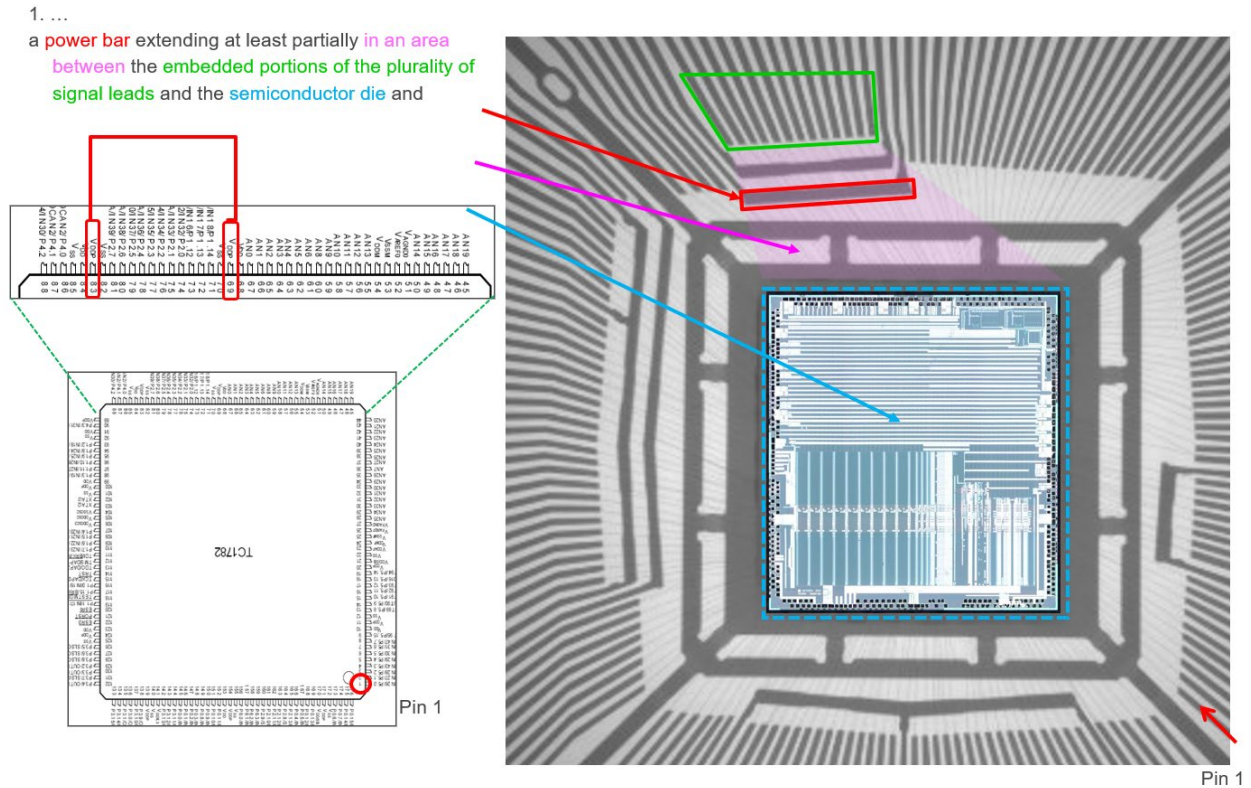


Pin 1



Pin 1

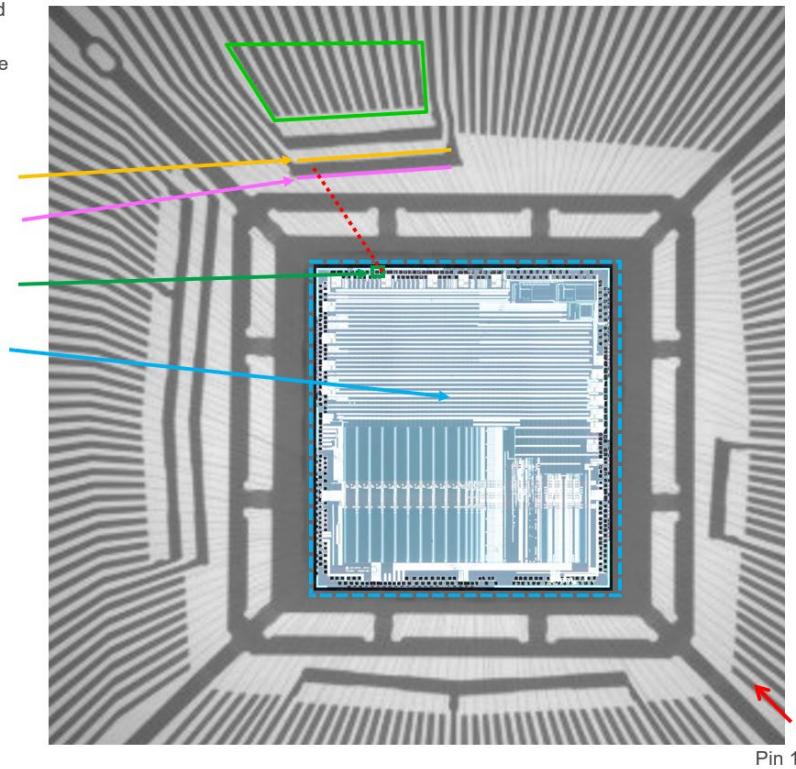
66. On information and belief, the Infineon 32-bit MCU TriCore Package includes a power bar extending at least partially in an area between the embedded portions of the plurality of signal leads and the semiconductor die.



67. On information and belief, the Infineon 32-bit MCU TriCore Package includes a power bar having a first side opposing the signal leads and a second side opposing the semiconductor die, the power bar being electrically connected to the at least one second contact pad.

1. ...

having a first side opposing the signal leads and a second side opposing the semiconductor die, the power bar being electrically connected to the at least one second contact pad; and

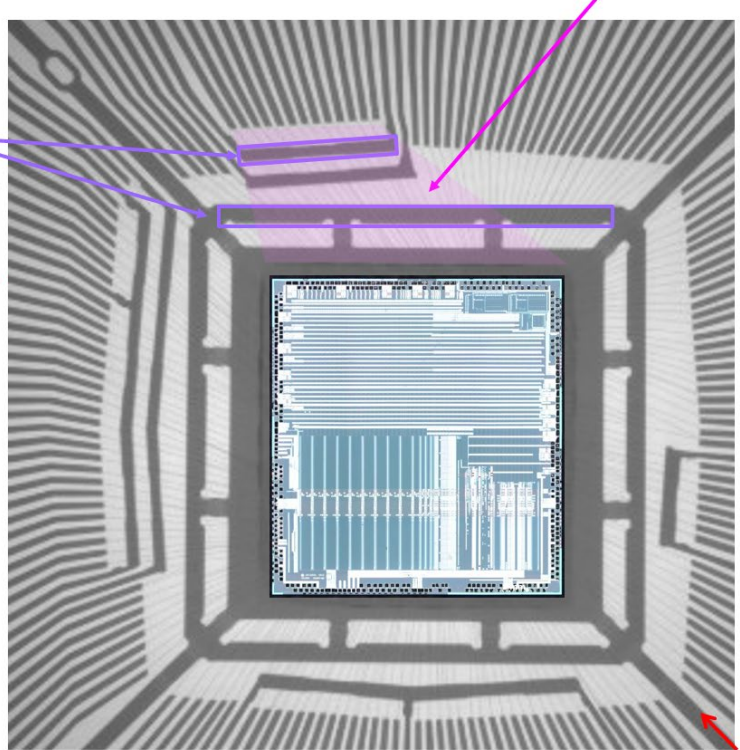
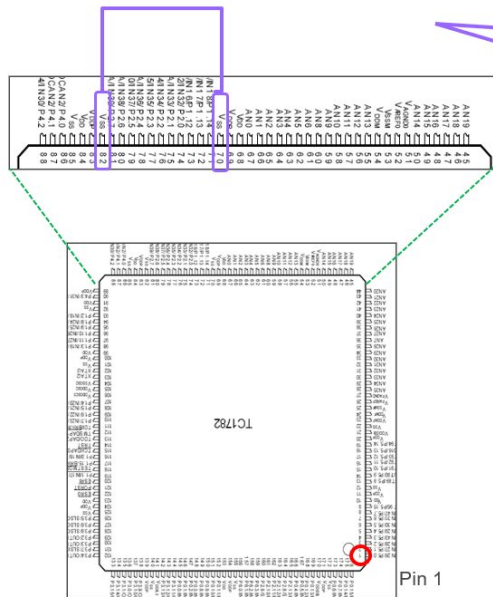


Pin 1

68. On information and belief, the Infineon 32-bit MCU TriCore Package includes a ground bar that is electrically grounded and extends at least partially in said area.

1. ...

a ground bar that is electrically grounded and extends at least partially in said area,

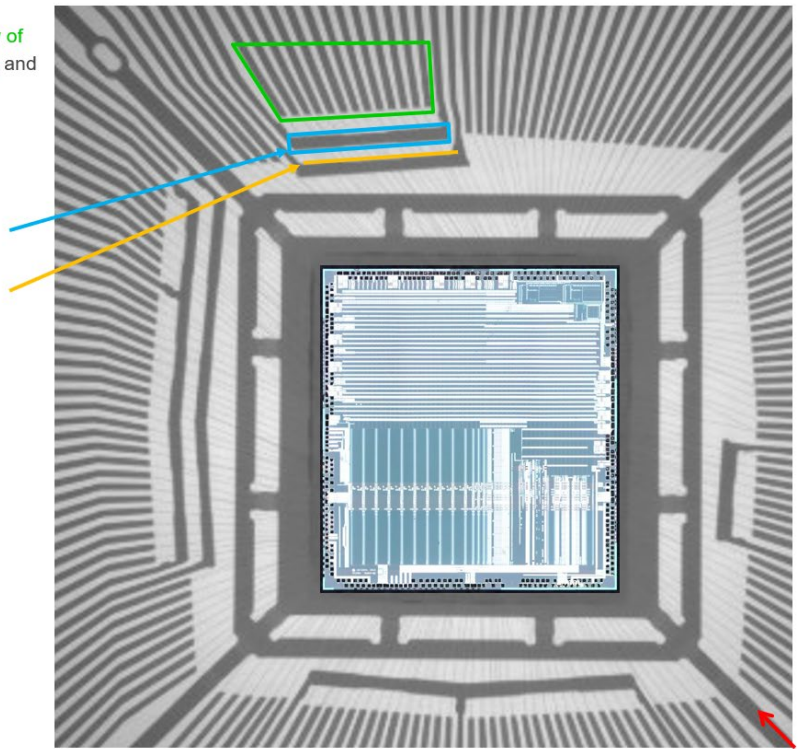


Pin 1

69. On information and belief, the Infineon 32-bit MCU TriCore Package includes a ground bar having a first portion disposed between the embedded portions of the plurality of signal leads and the first side of the power bar.

1. ...

the ground bar having a first portion disposed between the embedded portions of the plurality of signal leads and the first side of the power bar, and

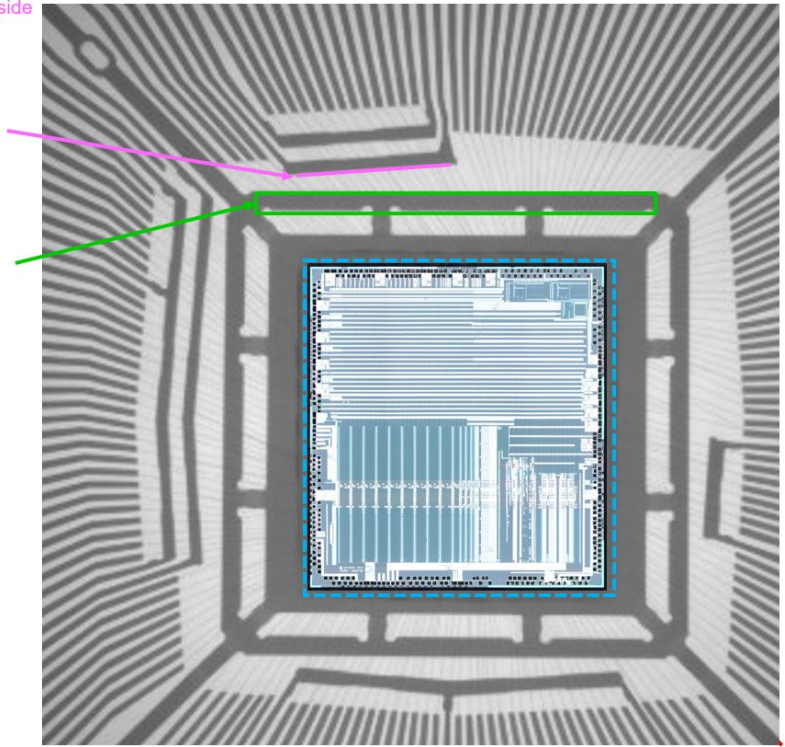


Pin 1

70. On information and belief, the Infineon 32-bit MCU TriCore Package includes a ground bar having a second portion disposed between the second side of the power bar and the semiconductor die.

1. ...

a second portion disposed between the second side of the power bar and the semiconductor die.



Pin 1

71. Fact and expert discovery are expected to confirm that the Accused Products infringe the '646 Patent, for which further evidence may lie in whole or in part in technical documents to which Chip Packaging does not presently have access.

72. Further, on information and belief, Defendant has and continues to indirectly infringe one or more claims of the '646 Patent, including claim 1, by knowingly and intentionally inducing others, including third-party semiconductor foundries, other types of third-party manufacturers, customers, and/or end-users to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States the Accused Products.

73. Defendant, with knowledge that these products, and/or the manufacture thereof, infringe the '646 Patent at least as of the date of this Complaint, knowingly and intentionally induced, and continues to knowingly and intentionally induce direct infringement of the '646

Patent by contracting for the third-party manufacture of, and/or providing the Accused Products to direct infringers.

74. Defendant has induced infringement by others, including third-party semiconductor foundries, other types of third-party manufacturers, customers, and/or end-users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there was a high probability that others infringe the '646 Patent, but while remaining willfully blind to the infringement.

75. Defendant is not licensed or otherwise authorized to practice the claims of the '646 Patent.

76. Thus, by its acts, Defendant has injured Chip Packaging and is liable to Chip Packaging for directly and/or indirectly infringing one or more claims of the '646 Patent, whether literally or under the doctrine of equivalents, including without limitation claim 1.

77. As a result of Defendant's infringement of the '646 Patent, Chip Packaging has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Defendant's infringement, but in no event less than a reasonable royalty with interest and costs.

THIRD COUNT
(Infringement of U.S Patent No. 8,258,611)

78. Chip Packaging incorporates by reference the allegations set forth in Paragraphs 1-77 of the Complaint as though fully set forth herein.

79. The claims of the '611 Patent are valid and enforceable.

80. Infineon has and continues to directly infringe the '611 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States the Accused Products made using the patented methods including, but not limited to, products that satisfy each and every

limitation of one or more claims of the '611 Patent. Upon information and belief, such products include at least the Infineon IGI60F1414A1 CoolGaN Integrated Power Stage, Infineon TLF51801 OPTIREG Asynchronous DC/DC Step-Down Converter, Infineon TLE9872QT MOTIX Microcontroller, and Infineon TLE9461ES OPTIREG Power Management IC and all other products with delamination barrier structures that are not colorably different, including but not limited to CY9BF364LPMC1-G-JNE2, S6E1C12C0AGV20000, TC213L8F133NACKXUMA1, TC223S16F133FACKXUMA1, TC234L32F200NACKXUMA1, TC265D40F200NBCKXUMA1, TC275T64F200WDCKXUMA1, TC322LP16F160FAAKXUMA1, TC333LP32F200FAAKXUMA1, TC364DP64F300FAALXUMA1, TLE9877QTW40XUMA1.

81. For example, the Accused Products incorporates and/or implements elements that are identical or equivalent to each claimed element of the patented invention pointed out by at least Claim 1 of the '611 Patent.

82. Claim 1 of the '611 Patent recites:

1. A leadframe structure for an electronic package, the leadframe structure comprising:

a die-pad configured and arranged for die attachment,

a bonding area and

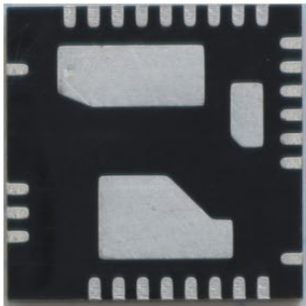
a barrier area having a barrier structure connecting the die-pad and the bonding area and configured and arranged with a length and width, at a connection between the barrier and the die-pad, that mitigates the delamination of a moulding compound from the barrier as the moulding compound delaminates from a portion of the die-pad adjacent the connection between the barrier and the die pad.

'611 Patent, Cl. 1.

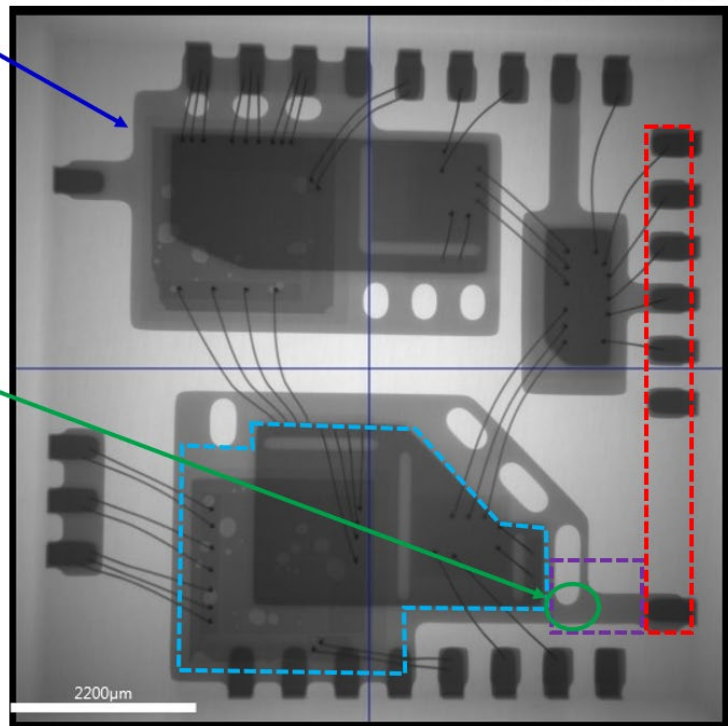
83. For example, the Infineon IGI60F1414A1 is a lead frame structure for an electronic package that satisfies each claim element.

1. A leadframe structure for an electronic package, the leadframe structure comprising:
- a die-pad configured and arranged for die attachment,
 - a bonding area and
 - a barrier area having a barrier structure connecting the die-pad and the bonding area and
- configured and arranged with a length and width, at a connection between the barrier and the die-pad, that mitigates the delamination of a moulding compound from the barrier as the moulding compound delaminates from a portion of the die-pad adjacent the connection between the barrier and the die pad.

Package Bottom Image



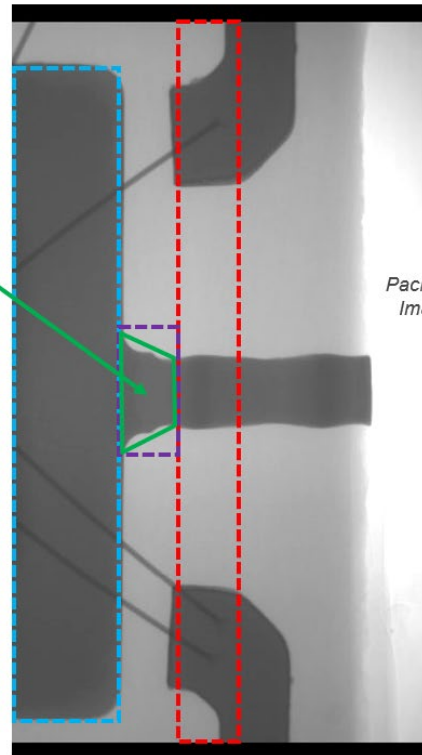
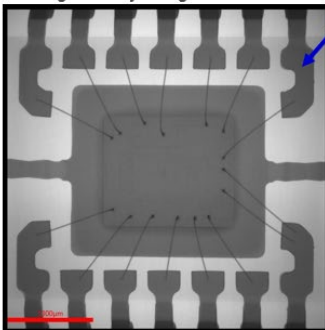
Package X-Ray Image



84. As another example, the Infineon TLF51801ELV is a lead frame structure for an electronic package that satisfies each claim element.

1. A leadframe structure for an electronic package, the leadframe structure comprising:
 a die-pad configured and arranged for die attachment,
 a bonding area and
 a barrier area having a barrier structure connecting the die-pad and the bonding area and
 configured and arranged with a length and width, at a connection between the barrier and the die-pad, that mitigates the delamination of a moulding compound from the barrier as the moulding compound delaminates from a portion of the die-pad adjacent the connection between the barrier and the die pad.

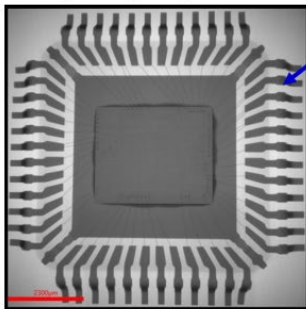
Package X-Ray Image



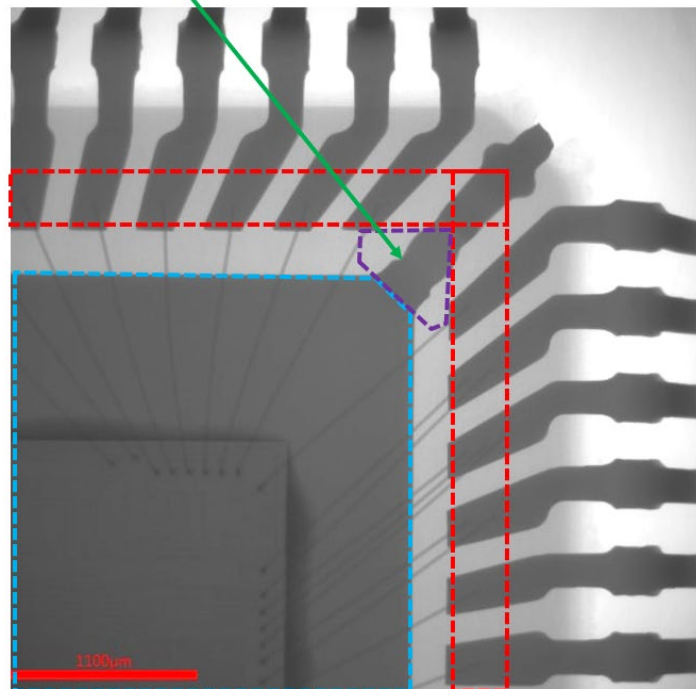
85. As another example, the Infineon TLE9872QT is a lead frame structure for an electronic package that satisfies each claim element.

1. A leadframe structure for an electronic package, the leadframe structure comprising:
- a die-pad configured and arranged for die attachment,
 - a bonding area and
 - a barrier area having a barrier structure connecting the die-pad and the bonding area and
- configured and arranged with a length and width, at a connection between the barrier and the die-pad, that mitigates the delamination of a moulding compound from the barrier as the moulding compound delaminates from a portion of the die-pad adjacent the connection between the barrier and the die pad.

Package X-Ray Image



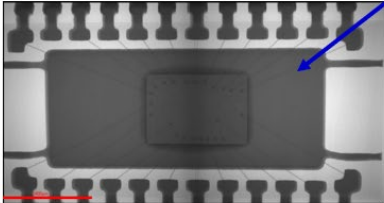
Package X-Ray Image Detail



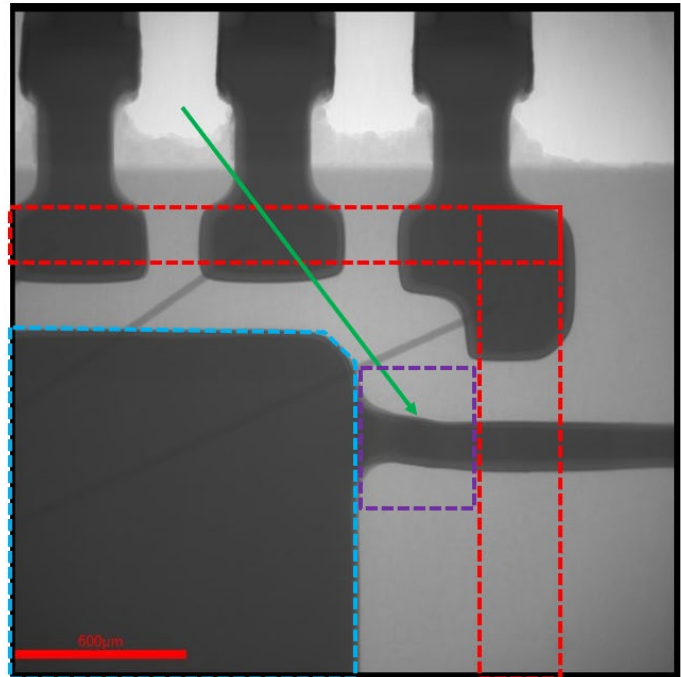
86. As another example, the Infineon TLE9461ES is a lead frame structure for an electronic package that satisfies each claim element.

1. A leadframe structure for an electronic package, the leadframe structure comprising:
 a die-pad configured and arranged for die attachment,
 a bonding area and
 a barrier area having a barrier structure connecting the die-pad and the bonding area and
 configured and arranged with a length and width, at a connection between the barrier and the die-pad, that mitigates the delamination of a moulding compound from the barrier as the moulding compound delaminates from a portion of the die-pad adjacent the connection between the barrier and the die pad.

Package X-Ray Image



Package X-Ray Image Detail



87. Fact and expert discovery are expected to confirm that the Accused Products infringe the '611 Patent, for which further evidence may lie in whole or in part in technical documents to which Chip Packaging does not presently have access.

88. Further, on information and belief, Defendant has and continues to indirectly infringe one or more claims of the '611 Patent, including claim 1, by knowingly and intentionally inducing others, including third-party semiconductor foundries, other types of third-party manufacturers, customers, and/or end-users to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States the Accused Products.

89. Defendant, with knowledge that these products, and/or the manufacture thereof, infringe the '611 Patent at least as of the date of this Complaint, knowingly and intentionally induced, and continues to knowingly and intentionally induce direct infringement of the '911

Patent by contracting for the third-party manufacture of, and/or providing the Accused Products to direct infringers.

90. Defendant has induced infringement by others, including third-party semiconductor foundries, other types of third-party manufacturers, customers, and/or end-users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there was a high probability that others infringe the '611 Patent, but while remaining willfully blind to the infringement.

91. Defendant is not licensed or otherwise authorized to practice the claims of the '611 Patent.

92. Thus, by its acts, Defendant has injured Chip Packaging and is liable to Chip Packaging for directly and/or indirectly infringing one or more claims of the '611 Patent, whether literally or under the doctrine of equivalents, including without limitation claim 1.

93. As a result of Defendant's infringement of the '611 Patent, Chip Packaging has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Defendant's infringement, but in no event less than a reasonable royalty with interest and costs.

FOURTH COUNT
(Infringement of U.S Patent No. 9,685,351)

94. Chip Packaging incorporates by reference the allegations set forth in Paragraphs 1-93 of the Complaint as though fully set forth herein.

95. The claims of the '351 Patent are valid and enforceable.

96. Infineon has and continues to directly infringe the '351 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States the Accused Products made using the patented methods including, but not limited to, products that satisfy each and every

limitation of one or more claims of the '351 Patent. Upon information and belief, such products include at least the Infineon TC1782 TriCore 32-bit AUDO MAX MCU and all other products with positive mold lock structures that are not colorably different, including but not limited to TC213L8F133NACKXUMA1, TC223S16F133FACKXUMA1, TC234L32F200NACKXUMA1, TC265D40F200NBCKXUMA1, TC275T64F200WDCKXUMA1, TC322LP16F160FAAKXUMA1, TC333LP32F200FAAKXUMA1, TC364DP64F300FAALXUMA1.

97. For example, the Accused Products incorporates and/or implements elements that are identical or equivalent to each claimed element of the patented invention pointed out by at least Claim 1 of the '351 Patent.

98. Claim 1 of the '351 Patent recites:

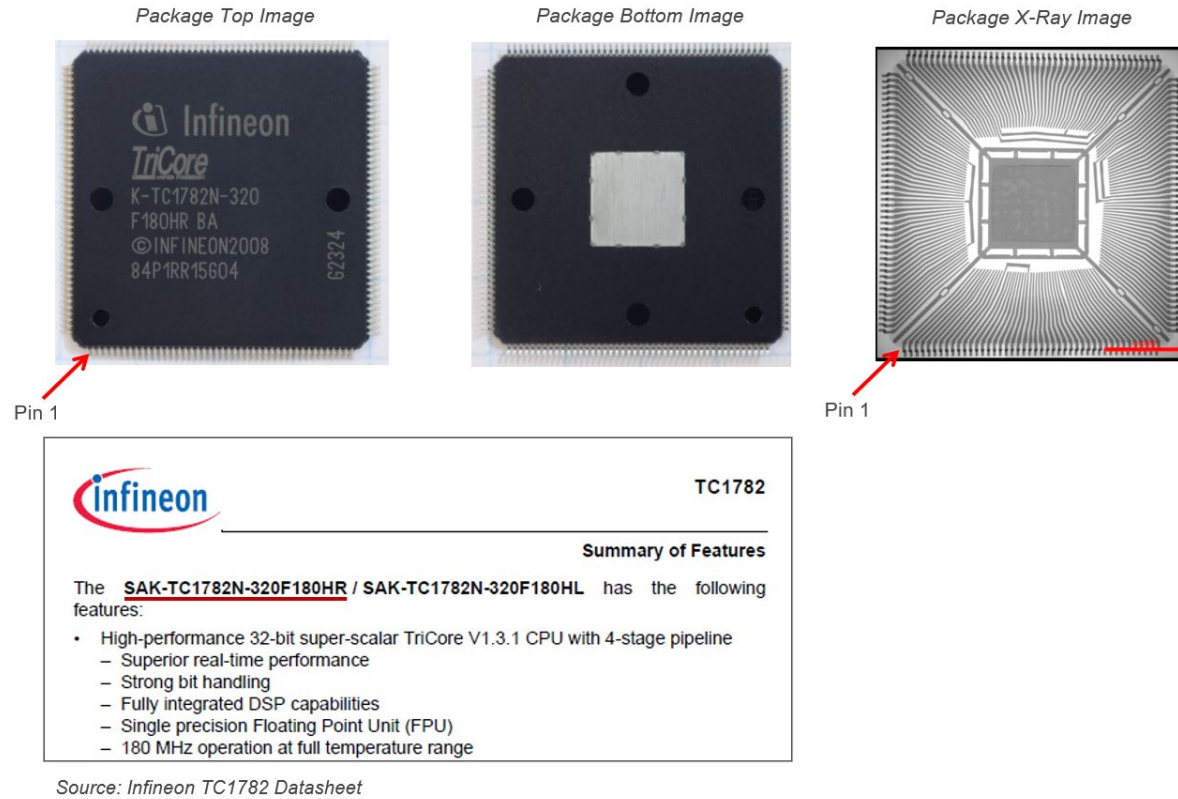
1. A method comprising:

providing a lead frame comprising a first die paddle and one or more electrical connector elements; and

forming one or more positive mold lock structures at predetermined locations on a top surface of the lead frame which laterally protrude above the top surface.

'351 Patent, Cl. 1.

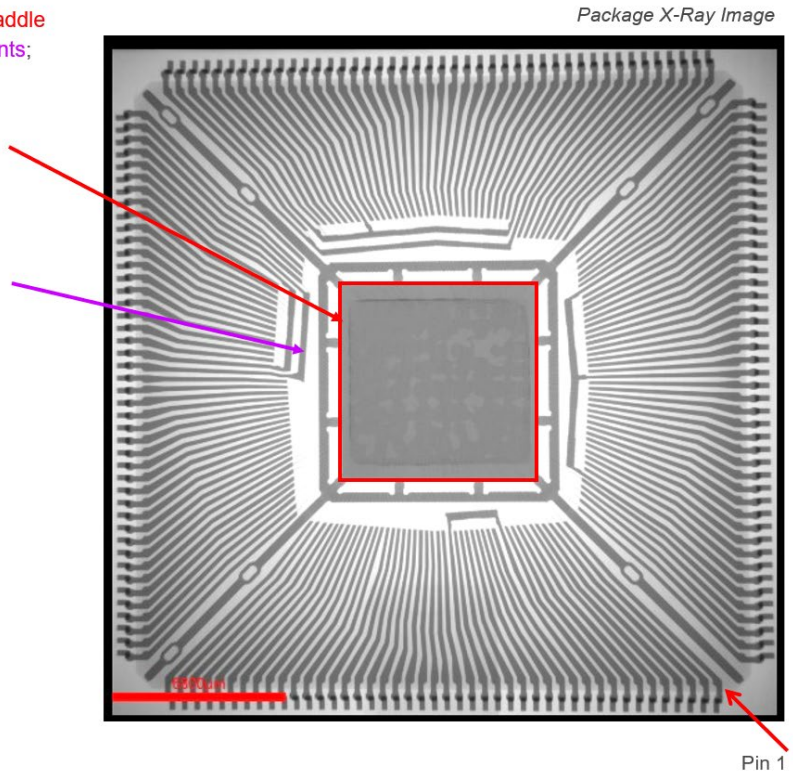
99. For example, the Infineon 32-bit AUDO MAX MCU implements a method for fabricating a microchip structure. The microchip structure of the Infineon AUDO MAX 32-bit MCU is illustrated below:



100. On information and belief, the Accused Products are manufactured using a process that provides a lead frame comprising a first die paddle and one or more electrical connector elements.

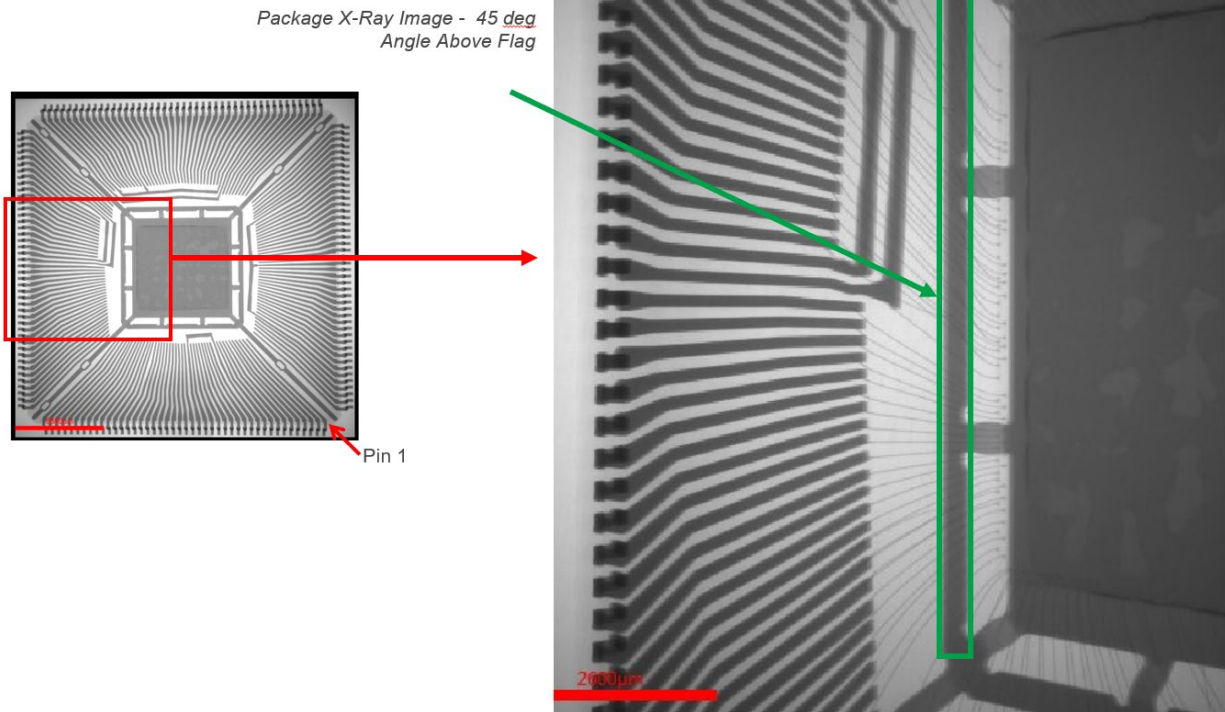
1. A method comprising:

providing a lead frame comprising a first die paddle
and one or more electrical connector elements;
and



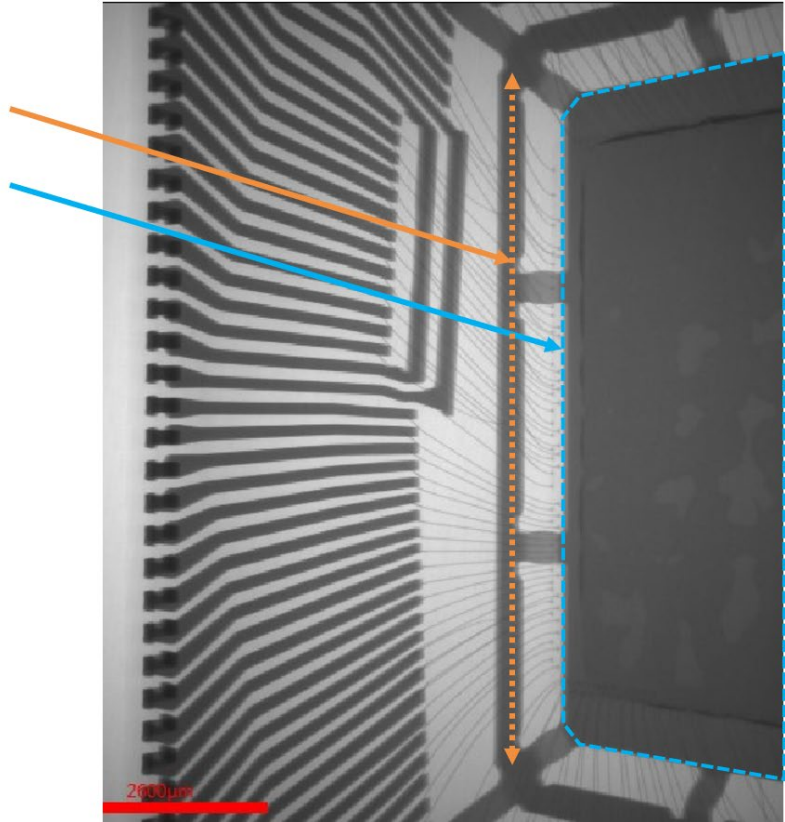
101. On information and belief, within the Accused Products are manufactured using a process that forms one or more positive mold lock structures at predetermined locations.

1. ...forming one or more positive mold lock structures at predetermined locations



102. On information and belief, within the Accused Products are manufactured using a process that forms one or more positive mold lock structures at predetermined locations on a top surface of the lead frame which laterally protrude above the top surface.

1. ...on a top surface of the lead frame which laterally protrude above the top surface.



103. Fact and expert discovery are expected to confirm that the Accused Products infringe the '351 Patent, for which further evidence may lie in whole or in part in technical documents to which Chip Packaging does not presently have access.

104. Further, on information and belief, Defendant has and continues to indirectly infringe one or more claims of the '351 Patent, including claim 1, by knowingly and intentionally inducing others, including third-party semiconductor foundries, other types of third-party manufacturers, customers, and/or end-users to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States the Accused Products.

105. Defendant, with knowledge that these products, and/or the manufacture thereof, infringe the '351 Patent at least as of the date of this Complaint, knowingly and intentionally induced, and continues to knowingly and intentionally induce direct infringement of the '351

Patent by contracting for the third-party manufacture of, and/or providing the Accused Products to direct infringers.

106. Defendant has induced infringement by others, including third-party semiconductor foundries, other types of third-party manufacturers, customers, and/or end-users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there was a high probability that others infringe the '351 Patent, but while remaining willfully blind to the infringement.

107. Defendant has and continues to infringe one or more claims of the '351 Patent by importing into the United States or offering to sell, selling, or using within the United States a product which is made by a process patented in the United States.

108. Defendant is not licensed or otherwise authorized to practice the claims of the '351 Patent.

109. Thus, by its acts, Defendant has injured Chip Packaging and is liable to Chip Packaging for directly and/or indirectly infringing one or more claims of the '351 Patent, whether literally or under the doctrine of equivalents, including without limitation claim 1.

110. As a result of Defendant's infringement of the '351 Patent, Chip Packaging has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Defendant's infringement, but in no event less than a reasonable royalty with interest and costs.

FIFTH COUNT
(Infringement of U.S Patent No. 8,394,713)

111. Chip Packaging incorporates by reference the allegations set forth in Paragraphs 1-110 of the Complaint as though fully set forth herein.

112. The claims of the '713 Patent are valid and enforceable.

113. Infineon has and continues to directly infringe the '713 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States the Accused Products made using the patented methods including, but not limited to, products that satisfy each and every limitation of one or more claims of the '713 Patent. Upon information and belief, such products include at least the Infineon IGI60F1414A1L CoolGaN product line and all other products with a nickel layer on a bond pad and a palladium layer that are not colorably different.

114. For example, the Accused Products incorporates and/or implements elements that are identical or equivalent to each claimed element of the patented invention pointed out by at least Claim 1 of the '713 Patent.

115. Claim 1 of the '713 Patent recites:

1. A method for forming over pad metallization (OPM) on a semiconductor die having a bond pad in which the bond pad has an inner portion surrounded by a passivation layer, comprising:

depositing a nickel layer on the bond pad, wherein a lack of adhesion between the nickel layer and the passivation layer results in a space between the nickel layer and the passivation layer down to the bond pad;

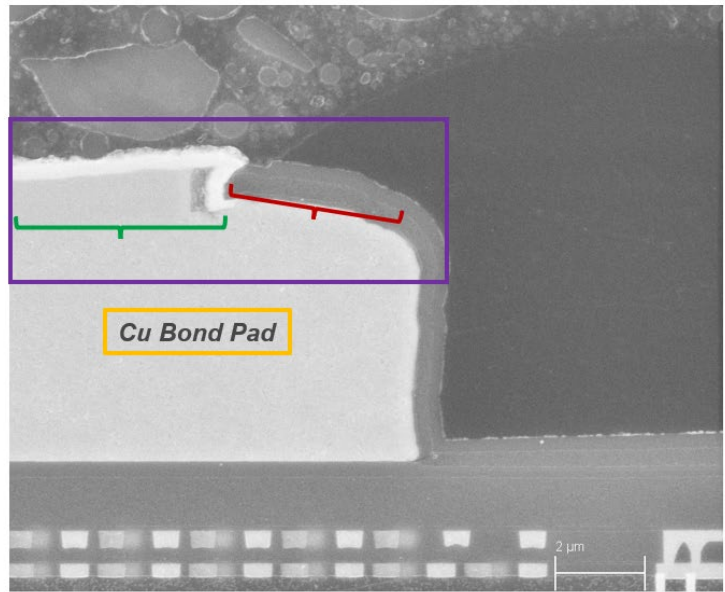
applying an isotropic etchant selective for nickel to the nickel layer to widen the space between the nickel layer and the passivation layer down to the bond pad; and

depositing a palladium layer on the nickel layer and in the space so as to be in contact, in the space, with the bond pad, the passivation layer, and the nickel layer.

'713 Patent, Cl. 1.

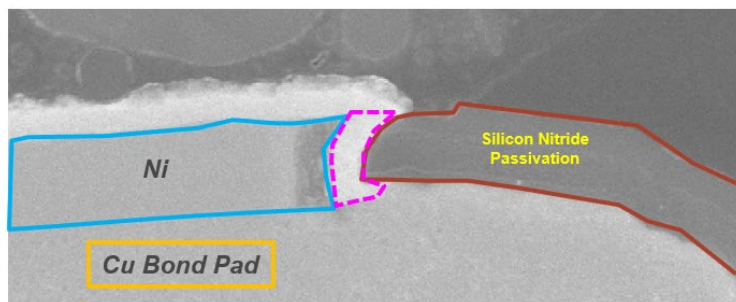
116. For example, the Infineon IGI60F1414A1L CoolGaN implements a method for forming over pad metallization on a semiconductor die having a bond pad in which the bond pad has an inner portion surrounded by a passivation layer.

1. A method for forming over pad metallization (OPM) on a semiconductor die having a bond pad in which the bond pad has an inner portion surrounded by a passivation layer, comprising: depositing a nickel layer on the bond pad, wherein a lack of adhesion between the nickel layer and the passivation layer results in a space between the nickel layer and the passivation layer down to the bond pad; applying an isotropic etchant selective for nickel to the nickel layer to widen the space between the nickel layer and the passivation layer down to the bond pad; and depositing a palladium layer on the nickel layer and in the space so as to be in contact, in the space, with the bond pad, the passivation layer, and the nickel layer.



117. On information and belief, the Accused Products are manufactured using a process that deposits a nickel layer on the bond pad, wherein a lack of adhesion between the nickel layer and the passivation layer results in a space between the nickel layer and the passivation layer down to the bond pad.

1. A method for forming over pad metallization (OPM) on a semiconductor die having a bond pad in which the bond pad has an inner portion surrounded by a passivation layer, comprising: depositing a nickel layer on the bond pad, wherein a lack of adhesion between the nickel layer and the passivation layer results in a space between the nickel layer and the passivation layer down to the bond pad; applying an isotropic etchant selective for nickel to the nickel layer to widen the space between the nickel layer and the passivation layer down to the bond pad; and depositing a palladium layer on the nickel layer and in the space so as to be in contact, in the space, with the bond pad, the passivation layer, and the nickel layer.

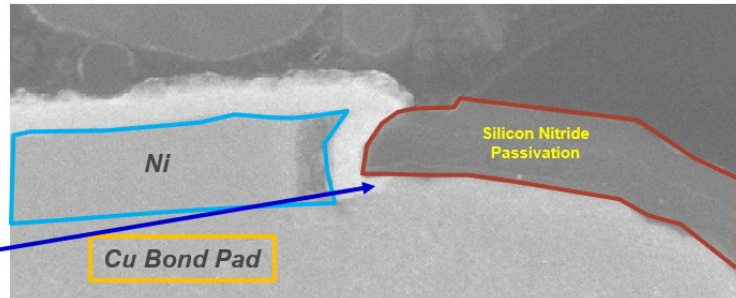


118. On information and belief, the Accused Products are manufactured using a process that applies an isotropic etchant selective for nickel to the nickel layer to widen the space between the nickel layer and the passivation layer down to the bond pad.

1. A method for forming over pad metallization (OPM) on a semiconductor die having a bond pad in which the bond pad has an inner portion surrounded by a passivation layer, comprising: depositing a nickel layer on the bond pad, wherein a lack of adhesion between the nickel layer and the passivation layer results in a space between the nickel layer and the passivation layer down to the bond pad;

applying an isotropic etchant selective for nickel to the nickel layer to widen the space between the nickel layer and the passivation layer down to the bond pad; and

depositing a palladium layer on the nickel layer and in the space so as to be in contact, in the space, with the bond pad, the passivation layer, and the nickel layer.

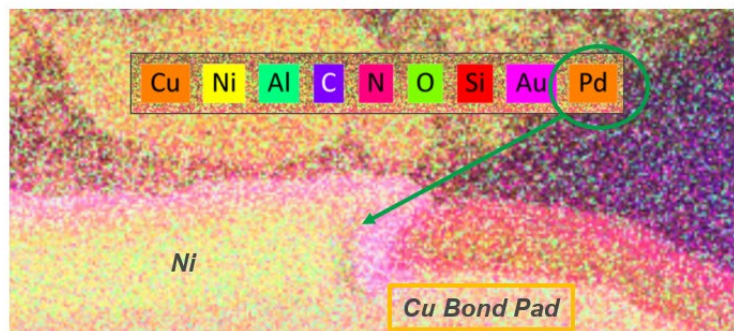
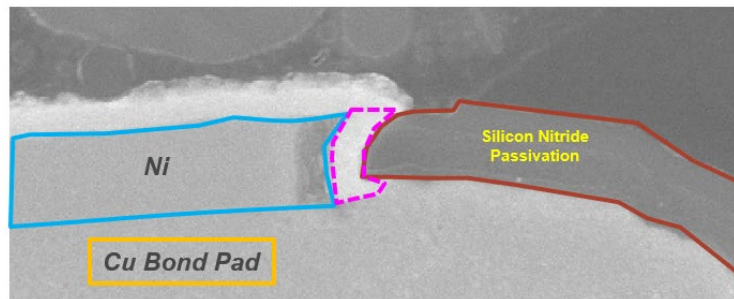


119. On information and belief, , the Accused Products are manufactured using a process that deposits a palladium layer on the nickel layer and in the space so as to be in contact, in the space, with the bond pad, the passivation layer, and the nickel layer.

1. A method for forming over pad metallization (OPM) on a semiconductor die having a bond pad in which the bond pad has an inner portion surrounded by a passivation layer, comprising: depositing a nickel layer on the bond pad, wherein a lack of adhesion between the nickel layer and the passivation layer results in a space between the nickel layer and the passivation layer down to the bond pad;

applying an isotropic etchant selective for nickel to the nickel layer to widen the space between the nickel layer and the passivation layer down to the bond pad; and

depositing a palladium layer on the nickel layer and in the space so as to be in contact, in the space, with the bond pad, the passivation layer, and the nickel layer.



120. Fact and expert discovery are expected to confirm that the Accused Products infringe the '713 Patent, for which further evidence may lie in whole or in part in technical documents to which Chip Packaging does not presently have access.

121. Further, on information and belief, Defendant has and continues to indirectly infringe one or more claims of the '713 Patent, including claim 1, by knowingly and intentionally inducing others, including third-party semiconductor foundries, other types of third-party manufacturers, customers, and/or end-users to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States the Accused Products.

122. Defendant, with knowledge that these products, and/or the manufacture thereof, infringe the '713 Patent at least as of the date of this Complaint, knowingly and intentionally induced, and continues to knowingly and intentionally induce direct infringement of the '713 Patent by contracting for the third-party manufacture of, and/or providing the Accused Products to direct infringers.

123. Defendant has induced infringement by others, including third-party semiconductor foundries, other types of third-party manufacturers, customers, and/or end-users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there was a high probability that others infringe the '713 Patent, but while remaining willfully blind to the infringement.

124. Defendant has and continues to infringe one or more claims of the '713 Patent by importing into the United States or offering to sell, selling, or using within the United States a product which is made by a process patented in the United States.

125. Defendant is not licensed or otherwise authorized to practice the claims of the '713 Patent.

126. Thus, by its acts, Defendant has injured Chip Packaging and is liable to Chip Packaging for directly and/or indirectly infringing one or more claims of the '713 Patent, whether literally or under the doctrine of equivalents, including without limitation claim 1.

127. As a result of Defendant's infringement of the '713 Patent, Chip Packaging has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Defendant's infringement, but in no event less than a reasonable royalty with interest and costs.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff prays for judgment and seeks relief from Defendant as follows:

- a. For judgment that Defendant has infringed and continues to infringe the claims of the '299,'646, '611, '351, and '713 Patents;
- b. For an accounting of all damages sustained by Plaintiff as a result of Defendant's acts of infringement;
- c. For a mandatory future royalty payable by Defendant in relation to each sale of an Accused Product that is found to infringe one or more of the Asserted Patents and all future products which are not colorably different from products found to infringe;
- d. For a judgment and order requiring Defendant to pay Plaintiff's damages, costs, expenses, and pre- and post-judgment interest for its infringement of the '299,'646, '611, '351, and '713 Patents as provided under 35 U.S.C. § 284;
- e. For a judgment and order finding that this is an exceptional case within the meaning of 35 U.S.C. § 285 and awarding to Plaintiff its reasonable attorneys' fees; and
- f. For such other and further relief in law and in equity as the Court may deem just and proper.

DEMAND FOR JURY TRIAL

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, Plaintiff demands a trial by jury in this action for all issues triable by a jury.

Dated: February 6, 2025

Respectfully Submitted,

/s/ Garland Stephens by permission Andrea L. Fair

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